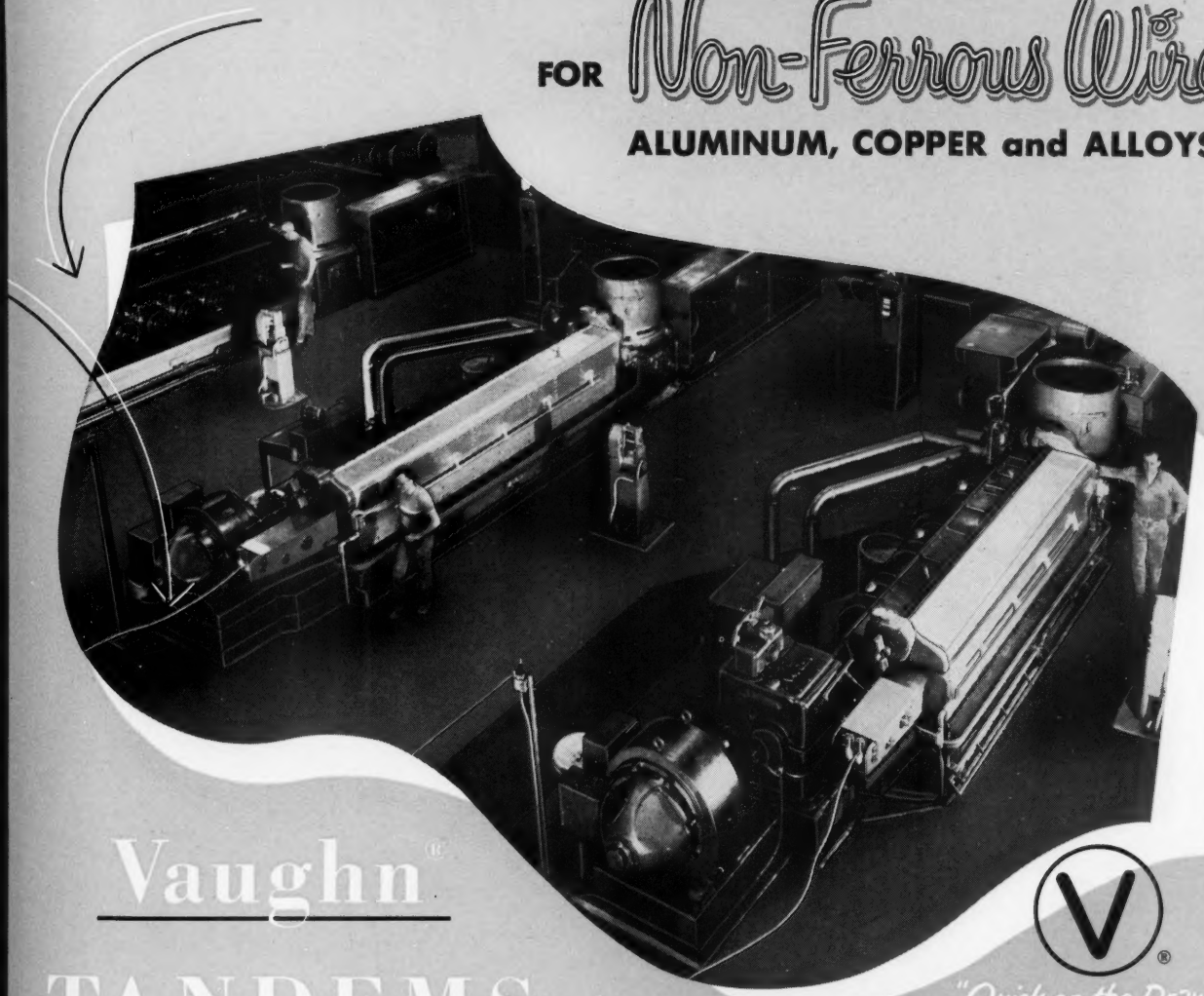
WIRE AND WIRE PRODUCTS

JULY 1952

FOR Non-Ferrous Wire

ALUMINUM, COPPER and ALLOYS



Vaughn®

TANDEMS

High production rates, with smooth, safe operation at all speeds, are maintained by Vaughn Tandems with complete dependability in drawing wire of aluminum, copper and their alloys. Let us discuss your particular requirements.

"Quick on the Draw!"

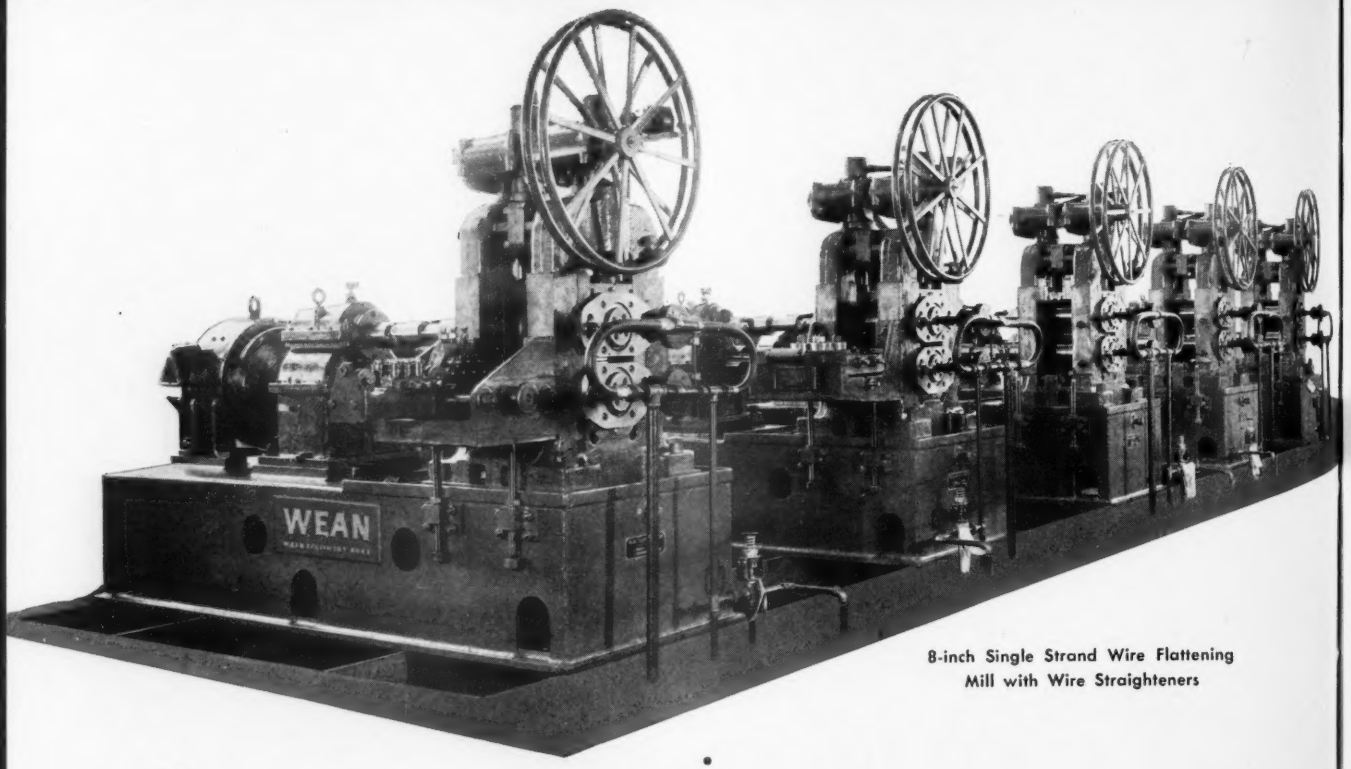
THE VAUGHN MACHINERY CO.

Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

Wean



8-inch Single Strand Wire Flattening Mill with Wire Straighteners

A COMPLETE ENGINEERING SERVICE FOR WIRE MILL INSTALLATIONS

Complete Installations for Electro Galvanizing, Hot Dip Galvanizing, Patenting, Tinning, Wire Flattening, Nail Galvanizing and Blueing.

Complete Equipment for the Manufacture of Hexagon Netting, Hinge Joint Fence and Barbed Wire.

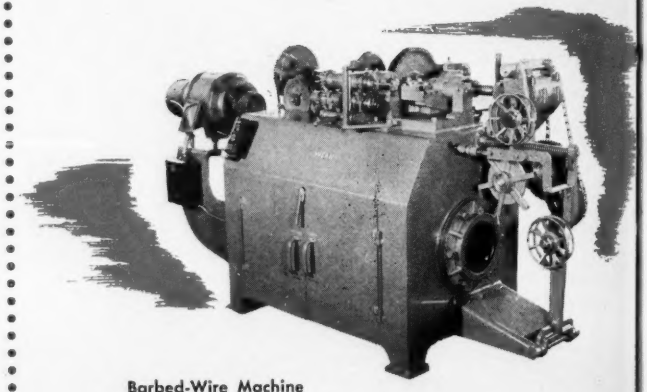
CHECK WEAN FIRST FOR WIRE MILL EQUIPMENT

STRIP MACHINERY

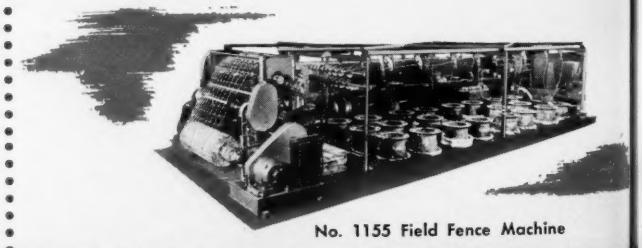
Slitting Installations. Cut to Length Installations. Bearing Metal Coating Installations. Two-Hi Rolling Mill Applications. Strip Grinding Installations. Levelers, Uncoilers, Pinch Rolls, Shears for Strip Processing lines.

WEAN EQUIPMENT CORPORATION

22800 LAKELAND BLVD. • CLEVELAND, OHIO



Barbed-Wire Machine

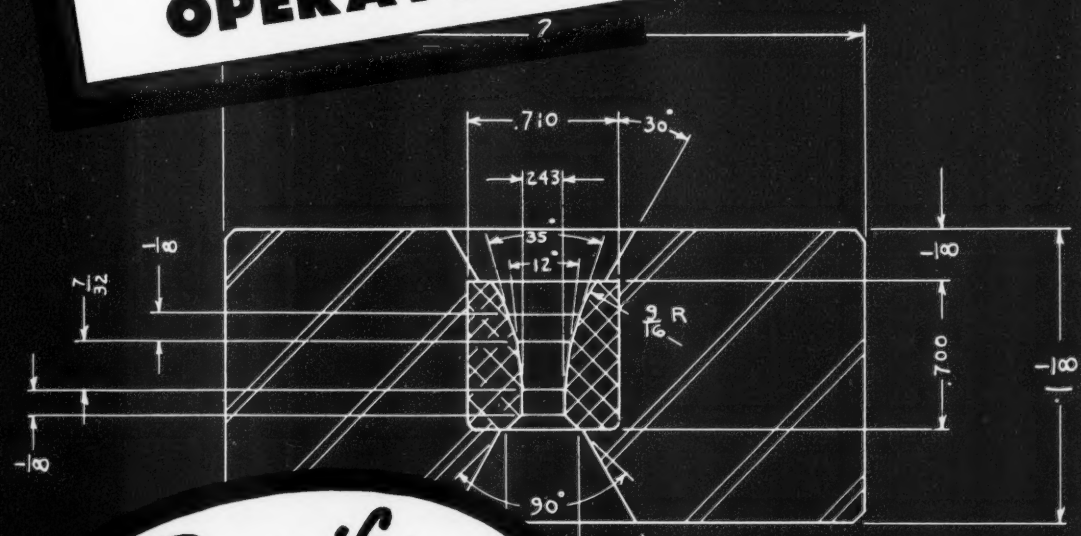


No. 1155 Field Fence Machine

Wean Equipment Corporation

CLEVELAND, OHIO

Memo to: ECONOMY-MINDED WIRE MILL OPERATORS



Specify Firthaloy

PRODUCTS: WIRE DRAWING DIES	
FOR: WIRE DRAWING DIVISION	
SIZE: R-6 FINISHED	HOLE: .243
SPECIFY: FIRTHALOY	
DRWG APVD:	DATE: 2-3-51
RVSNS: NONE	

R-225

Firth Sterling
INCORPORATED

DETROIT • DAYTON • CLEVELAND • HARTFORD
NEW YORK • CHICAGO • PITTSBURGH
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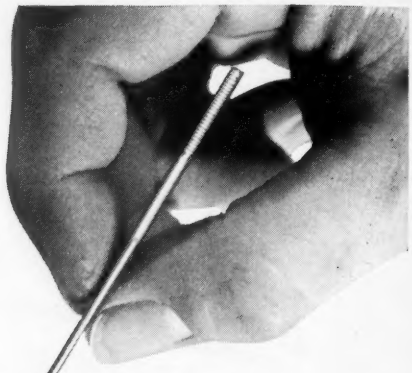
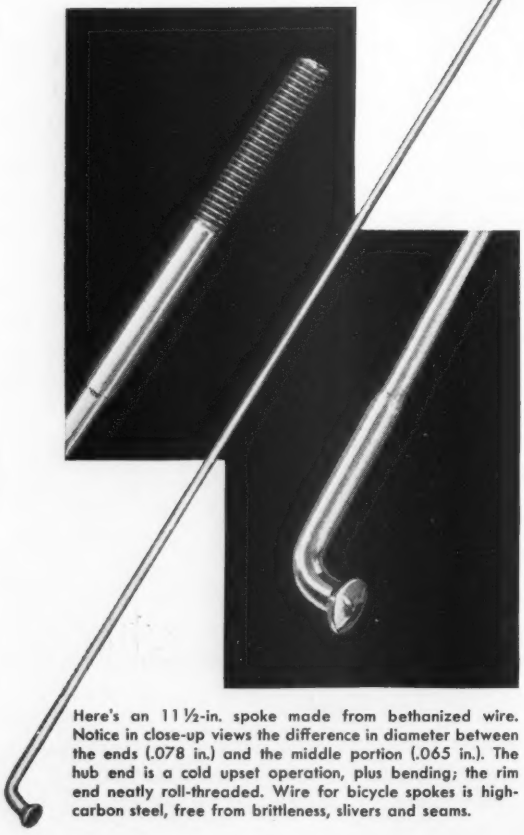


Bicycle Spokes...Good Exercise for Bethanized Wire



Here's an 11½-in. spoke made from bethanized wire. Notice in close-up views the difference in diameter between the ends (.078 in.) and the middle portion (.065 in.). The hub end is a cold upset operation, plus bending; the rim end neatly roll-threaded. Wire for bicycle spokes is high-carbon steel, free from brittleness, slivers and seams.

From the moment it spins off the coil, wire used for bicycle spokes takes a beating. Forming operations call for swaging, upsetting, threading and bending. Later, as a hard-working spoke, the wire must shake off kicks, collisions and, toughest of all, corrosion.

Manufacturers choose bethanized wire for rugged jobs because it comes through severe fabrication without losing its smooth good looks or its ability to fight rust.

Bethanized wire's top feature is its zinc coating —99 pct pure, of uniform thickness, highly ductile, and tightly adhering to the steel base. Bend the wire, twist it, even draw it through a series of dies —the zinc doesn't crack, flake or peel. Rust finds no inviting thin spots anywhere along the wire.

Next time you have a difficult forming job or a corrosion problem, try bethanized wire. The nearest Bethlehem sales office will be glad to give you more information. Or write to us at Bethlehem, Pa.

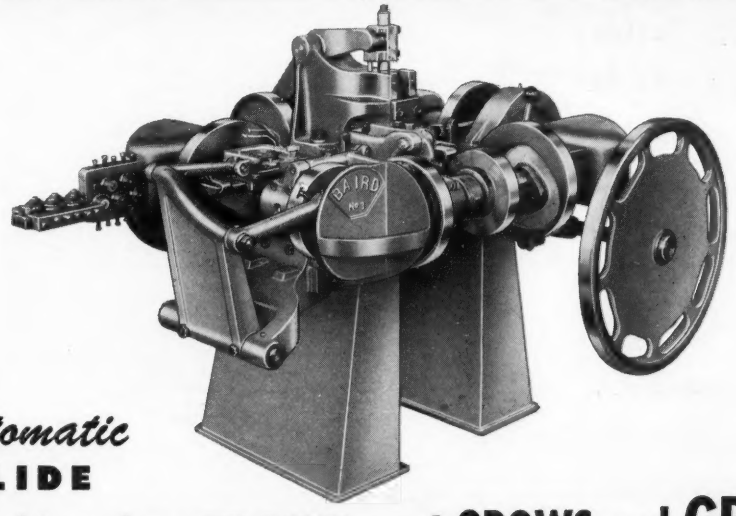
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

ASK **BAIRD** ABOUT IT!

HIGH PRODUCTION TOOLING



BAIRD *Automatic* FOUR SLIDE

. . . the Machine that GROWS and GROWS and GROWS

Start, if you wish, with the standard (stocked) 4-slide, which in itself is remarkably versatile in forming hundreds of articles from wire and ribbon metal.

Then when conditions demand . . . a call for either even greater versatility of production or a change in certain products . . . you may add one or more attachments to the standard model, so designed that "machine growth" is simplified and practical.

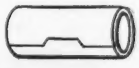
Thus, with gradual investments, you will build your Baird 4-slide to a full production unit capable of turning out the widest variety of wire and ribbon products. Here is a list of attachments easily added . . . but naturally, not all on one machine . . . as they might become too complicated.

1 Horizontal Press Attachments

2 Form Raising Attachment

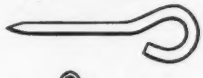
3 Pin Pulling Attachment

4 Setting Attachment

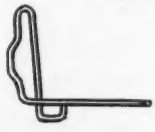


5 Secondary Cut-Off Attachment

6 Nail Point (Vertical Cut-Off) Attachment



7 Vertical Forming Attachment



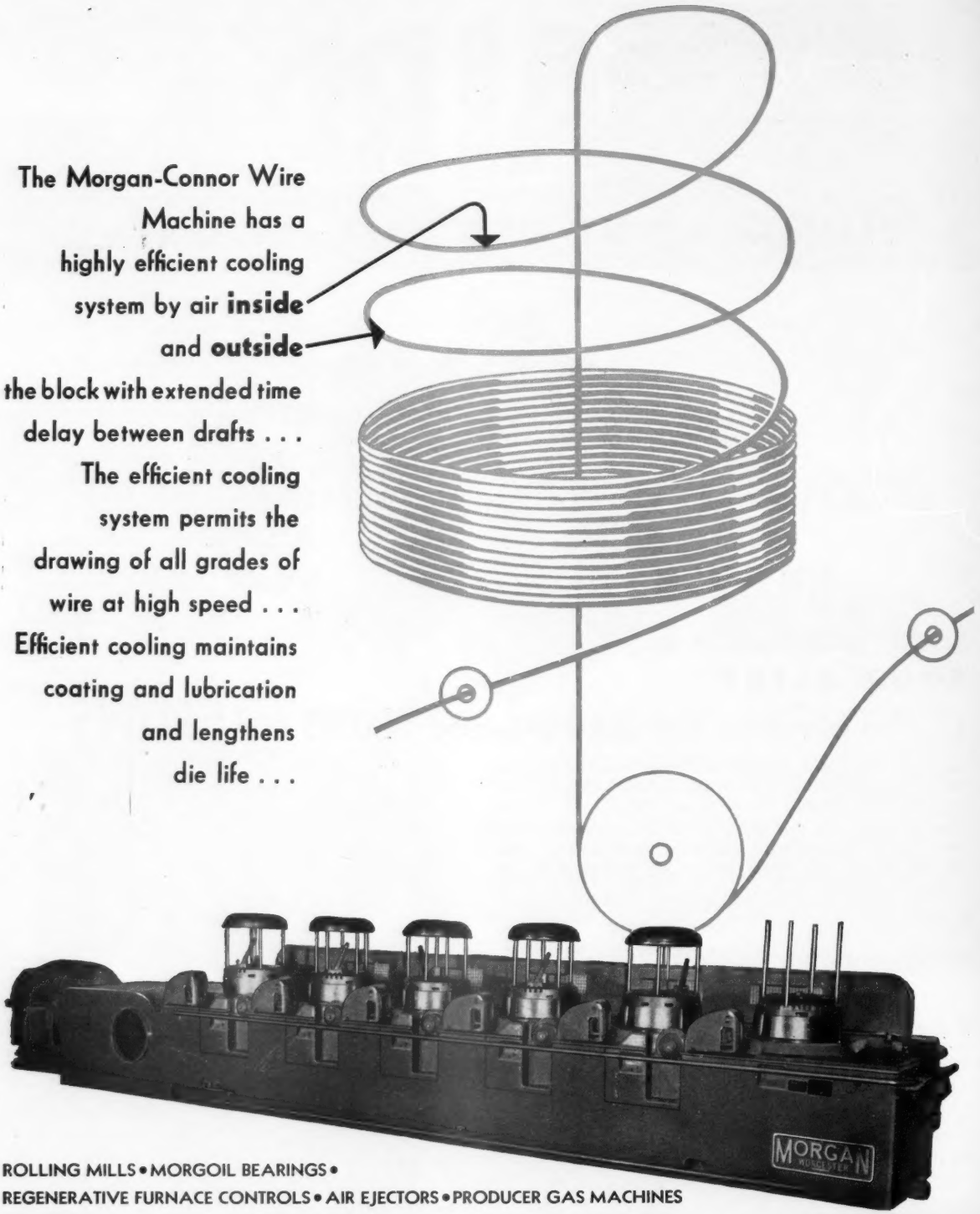
Baird engineers will gladly develop tooling from your parts or specification. "Ask Baird about it!"

the **BAIRD MACHINE COMPANY**
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

4BA32

The Morgan-Connor Wire Machine has a highly efficient cooling system by air **inside** and **outside** the block with extended time delay between drafts . . . The efficient cooling system permits the drawing of all grades of wire at high speed . . . Efficient cooling maintains coating and lubrication and lengthens die life . . .



ROLLING MILLS • MORGOIL BEARINGS •
REGENERATIVE FURNACE CONTROLS • AIR EJECTORS • PRODUCER GAS MACHINES

MORGAN-CONNOR
WIRE MACHINES

WM 64

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASSACHUSETTS

WIRE AND WIRE PRODUCTS

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 27 JULY, 1952 No. 7

Designated as Official Publication By The Wire Association

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NILES

FLANGED STEEL TRAVERSES

... eliminate the labor of handling large numbers of small parts ... make it easy to assemble reels in four simple steps.

And, they make up into strong reels that can be used over and over. Actual experience records show as much as sixteen years' service without refinishing or major maintenance, as well as a 50% to 100% increase in the number of trips before cut downs or scrapping of wooden heads.

Niles Flanged Steel Traverses are manufactured in sizes up to 56" diameter and 48" traverse—in plain, painted or hot dip galvanized finish—as light as 18 gauge steel. Width of flange and number of bolt and drain holes are furnished to your specifications. Available for prompt delivery. *Write for prices.*

• • •

Manufactured Under License Arrangements With Western Electric Co., Inc.

REPUBLIC STEEL

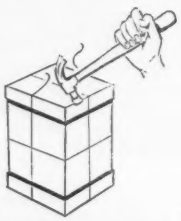
NILES STEEL PRODUCTS DIVISION

REPUBLIC STEEL CORPORATION
NILES • OHIO

It's easy to take nail inventory with

INTERNATIONAL'S keg-it

A glance at the side or top of KEG-IT tells you what size, nails are packed, and what's more — WHO MADE THEM. For the first time you can merchandise nails by brand name—tie your product in with your advertising. Until every last nail in the KEG-IT is used, your customer can correctly identify the type nail and who made it. If you'll write us, we will be glad to give you all of the facts.



QUICKLY OPENED

. . . No special tools needed —no head to break—no nails to pull.

QUICKLY EMPTIED

. . . Nails flow smoothly because they are not tangled or jumbled.

QUICKLY CLOSED

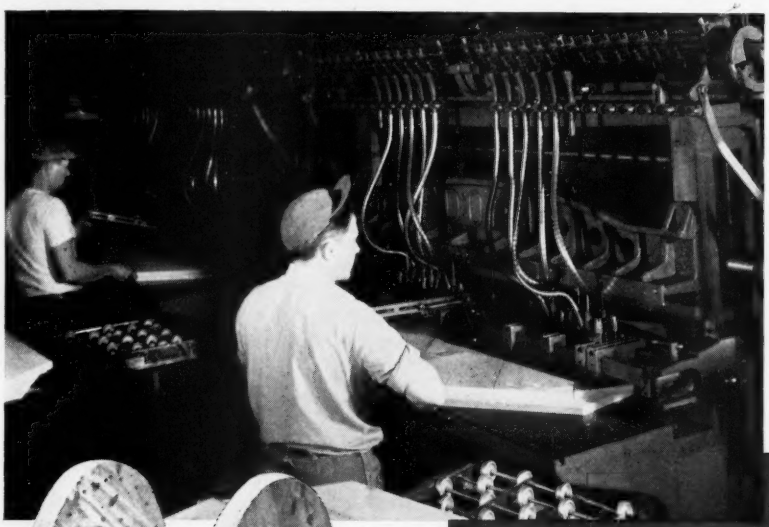
. . . Just replace the top to protect nails from dirt and weather.

International Paper company

CONTAINER DIVISION

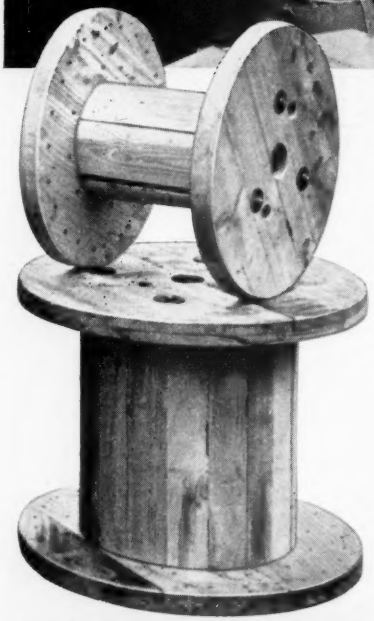
220 East 42nd Street, New York 17, N. Y.

EFFICIENT, STREAMLINED PRODUCTION METHODS RESULT IN THE BEST POSSIBLE



WOOD REELS for CABLE • ROPE • WIRE

12" to 96" in diameter.
Knocked down or assembled.
Returnable or non-returnable.
Reel heads for steel drums.
(Left: Automatic Nailing Machine)



BRIDGE PLANNING GETS ORDERS FILLED PROMPTLY

These production methods, plus Bridge's unique distribution service — truck and fast rail facilities — provide wood reel users with a combination of finely made reels and a good delivery service. Special equipment both for materials handling and manufacture make for volume production with a minimum loss of production time.

Low in cost, too, because of the exceptionally efficient straight-line production methods.

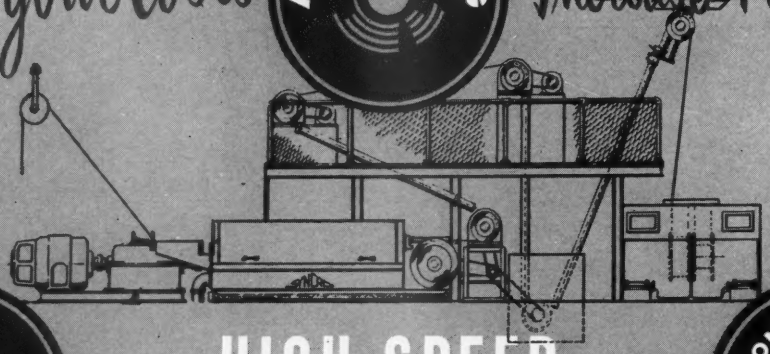
PLUS A SPEEDY SHIPPING SERVICE

Bridge delivers by truck to your door within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels in 5 days or less east of the Mississippi.

BRIDGE
MANUFACTURING CO.
HAZARDVILLE, CONN.
Phone Thompsonville, 3375

Let us quote on your reel needs. Send your specifications. Better yet, visit our plant and see how and why our reels are made so well at so low a cost.

Reduce your Costs ANNEALING Increase Production



DRAWING

CONTINUMATIC SPOOLING

HIGH SPEED CONTINUOUS OPERATION

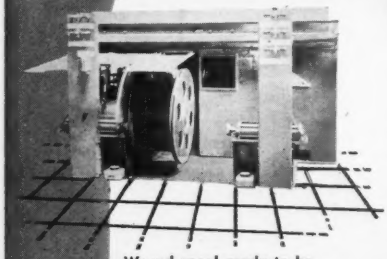
FOR

DRAWING AND RESISTANCE ANNEALING

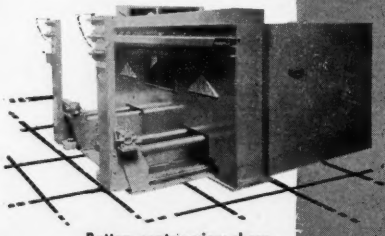
MADE POSSIBLE WITH

CONTINUMATIC SPOOLING

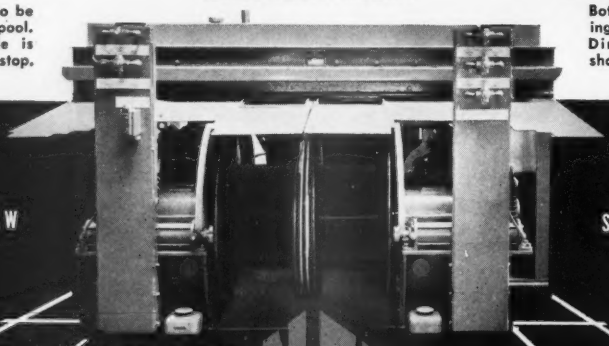
EXCLUSIVE SUPERIORITY BY PROVEN FIELD USE
NO SPOOL CHANGE-OVER SHUT DOWNS
SUCCESSIVE STARTING SHOCK LOADS ELIMINATED
PRE-DETERMINED PACKAGE WEIGHTS ASSURED
DESIRED ELONGATION WITH CONSISTENT QUALITY
MINIMUM OF CURRENT CONSUMPTION
HIGHER PERSONN EL SAFETY



Wound spool ready to be replaced with empty spool. Another spool inside is still spooling without stop.



Bottom center: view showing spool arrangement. Directly above: view shown during operation.



SOMETHING NEW

SOMETHING BETTER

ENGINEERS ALL OVER THE WORLD ACCLAIM
THIS EXCLUSIVE SCIENTIFIC ACHIEVEMENT OF

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AFFILIATED COMPANY: WINGET-SYNCRO, ROCHESTER, KENT, ENGLAND

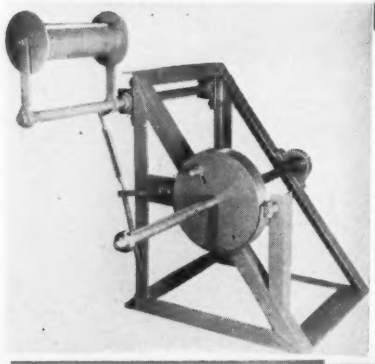
FURTHER DETAILS OF THIS ADVANCED IMPROVEMENT AVAILABLE ON REQUEST

Steelskin
LUBRICANTS

R. H. MILLER
Company, Inc., Homer 2, N. Y.

SOAPS AND COMPOUNDS FOR WIRE DRAWING, TUBE DRAWING, DEEP DRAWING AND STAMPING.

COMPLETELY AUTOMATIC SPARK TESTING EQUIPMENT FOR ELECTRIC WIRE AND CABLE



THE DAVIS PAY-OFF

The **DAVIS PAY-OFF** is of simple design and rugged construction. Tension and braking are controlled automatically, so that over-travel of wire is prevented. It will stop instantaneously when the wind-up spool stops.

Equipped with self-aligning ball bearing pillow blocks to reduce friction and prolong the life of the mechanism.

While designed primarily for use with **DAVIS SPARK TESTERS,** this versatile machine may be used in other operations in your mill where pay-offs are needed. Will give years of dependable service.

Pay-off stands are designed for right or left. Also in shaft sizes of 1¼" or 1½". Will accommodate reel sizes up to 30" in diameter and 16" wide.

ALL DAVIS ELECTRICAL EQUIPMENT MEETS UNDERWRITERS APPROVAL

THE No. 4 SPARK TESTER

This No. 4 unit and bead chain electrode combined with a Davis Pay-off stand, a Davis Take-up, and a predetermining counter, makes a complete Respooler and Resparker.

This complete unit will Spool Test wire up to 1200 feet per minute. It automatically shuts off when the reject is found by the sparker and also when the predetermined amount of wire has gone through the counter. Footage can be increased by lengthening the electrode. The unit can also be designed to produce constant footage. Listed below are the standard bead chain type electrodes and their capacity:

18"— 500 feet per minute—up to 1" wire size
24"— 800 feet per minute—up to 1" wire size
36"—1200 feet per minute—up to 1" wire size

This Davis spark tester is so thoroughly engineered, it will, if instructions are followed, detect 99% of all faults in the insulation.

This unit can also be obtained in voltages up to 30,000. Electrodes can also be obtained to accommodate up to 2" cable.

DAVIS SPARK TESTER OPERATES ON 110 VOLTAGE

220-440 MOTOR VOLTAGE ON ALL DAVIS EQUIPMENT —OTHER VOLTAGES MAY BE HAD TO MEET YOUR SPECIFICATIONS.

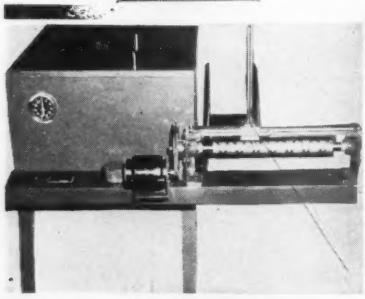
THE DAVIS PAY-OFF AND TAKE-UP IS BUILT FOR EITHER LEFT OR RIGHT HAND SHAFT.

COUNTER

The Davis predetermining counter is noted for its ease of setting and its accuracy. Mounted on its own pedestal, it can be easily moved for the convenience of the operation.

Wire size .010 to ½" also available in heavy duty model—wire capacity 3/16" - 1½" cable.

When used on a spark testing unit, its built-in switch immediately shuts off the power to your spool take-up or predetermined counter when any desired amount of wire has passed through it.



TAKE-UP

A versatile variable speed, constant tension, motor-driven mechanism that is electrically controlled.

Designed for use with the **DAVIS SPARKER,** it has nevertheless many other applications where fast and accurate lay-winding are desired.

This Take-up is equipped with an adjustable traverse that will accommodate reels up to 16 inches in width and 30 inches in diameter, with shaft sizes of 1¼" or 1½" in diameter.

The electrically controlled brake is completely automatic.

Your wire may be layer-wound by adjusting the spindle speed to correspond with that of the traverse. An automatic torque control starts the machine smoothly and slowly to prevent the breaking or stretching of wires.

The Davis Take-up unit is designed for adjustable speed ranges of 75 to 300 F.P.M. or 75 to 1200 F.P.M. A built-in tachometer indicates the speed.

TRAVERSE MOTOR 110 VOLTS—OTHER VOLTAGES MAY BE HAD TO MEET YOUR SPECIFICATIONS

DAVIS EQUIPMENT

DAVIS ELECTRIC CO. WALLINGFORD, CONN., U.S.A.

HARNESS TESTERS • PAY-OFFS • TRAVERSES

SPARK TESTERS • SPOOLERS • TAKE-UPS • CAPSTANS

SPRING WIRE

For uniform quality, we're sure this spring wire is the best we've ever made

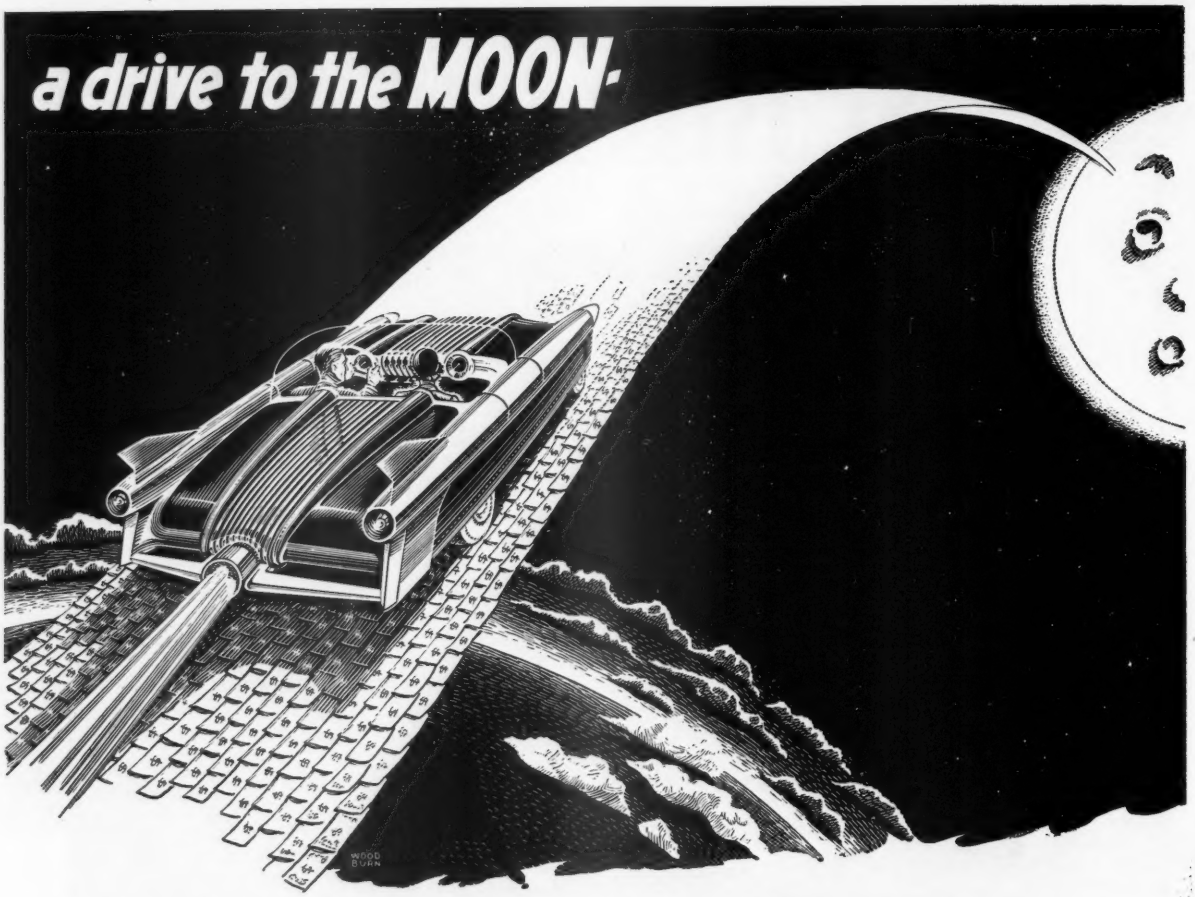
ROEBLING is about the largest specialty wire manufacturer in America. And with progressively improved facilities and more positive controls we are constantly turning out wires with a higher uniformity of gauge, finish and mechanical properties.

Among these products that save preparation time and boost production for users are mechanical spring wires including hard drawn, soft, annealed or oil-tempered M.B., H.B. and Extra H.B.; music wire; upholsterers' spring wire and valve spring wire... all in a full range of physical properties and finishes.

Large quantities of Roebling specialty wire are required in the defense program. We will always do our best, however, to meet your delivery needs. John A. Roebling's Sons Company, Trenton 2, N. J.

ROEBLING

ATLANTA, 934 AVON AVE • BOSTON, 51 SLEEPER ST • CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3253 FREDONIA AVE • CLEVELAND, 701 ST. CLAIR AVE, N. E. • DENVER, 4801 JACKSON ST • DETROIT, 915 FISHER BLDG • HOUSTON, 6216 NAVIGATION BLVD • LOS ANGELES, 5340 E. HARBOR ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS, 1920 E. 2ND ST • PHILADELPHIA, 230 VINE ST • SAN FRANCISCO, 1740 17TH ST • SEATTLE, 900 1ST AVE S. • TULSA, 321 N. CHEYENNE ST • EXPORT SALES OFFICE, TRENTON 2, N. J.



On a road paved with YOUR Dollars

A road twenty feet wide, carpeted with one dollar bills, extending 256,471 miles through space to the moon,--illustrates the astronomical magnitude of our Federal debt.

1932 was a bad year for most of us, whether we were in business, or looking for a job, or going to school.

1952 seems much better to the majority of our citizens, with increased business, high wages and a good education for the children.

But how much better off, really, are those of us who think "we're in clover"? Consider our National debt which has skyrocketed from 19 billion dollars to over 260 billion dollars in the past twenty years.

Such a figure is difficult to grasp. But it represents your debt, the amount that you and your family must pay. This debt is the obligation of every man, woman and child in the United States. The interest on this debt must be paid through taxes, and as the debt increases, the more our taxes will increase. If you have a wife and two children, your share of the Federal debt is now approximately $7,000.

Your debt is now 13 times what it was in 1932, and they're planning right now, down in Washington, to inflate it even more.

Do you like it? Is that what you want? If you don't like it and don't want further expansion of our Federal debt, it's up to you to let Washington know. Only when American citizens are aroused and speak up, by electing able and patriotic men to public office, will there be an end to this orgy of public extravagance.

YOUR SCRAP YOUNGSTOWN IS NEEDED

The Youngstown Sheet and Tube Company

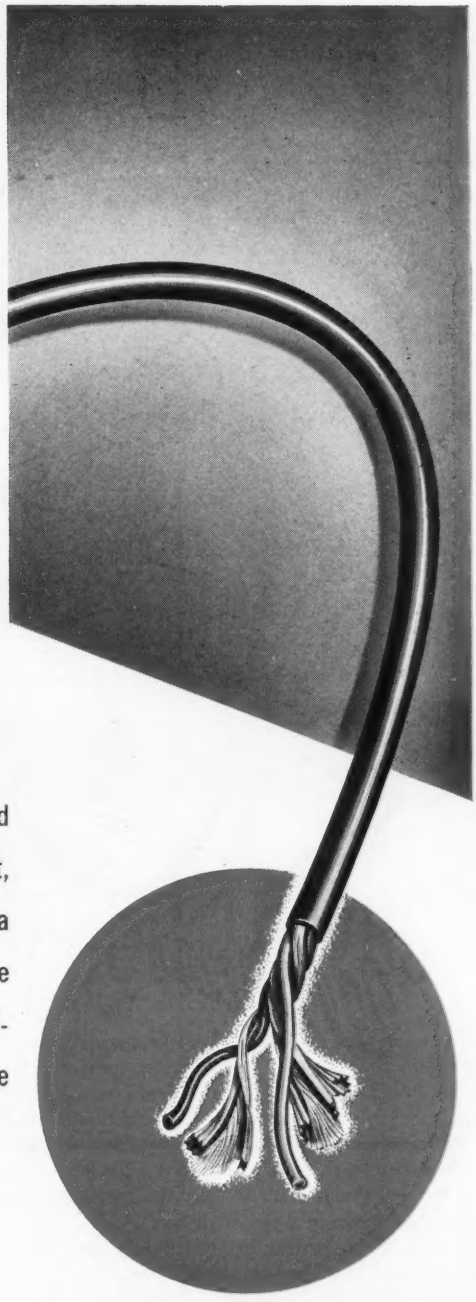
General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

Textilene Glascor® Fillers

(FIBERGLAS CENTERED)



FOR ALL TYPES OF WIRE AND WIRE CABLE

Manufacturers of wire and wire cable have found that Textilene® Fillers are less subject to dry rot, mildew and fungus attack. Textilene Glascor—a filler with a Fiberglas center for greater tensile strength—has better stripping action, greater uniformity, more flexibility, and wider tensile range without change in bulk.

Talk to Twitchell people about your filler requirements. They'll be glad to give you technical assistance. No obligation.

E. W. TWITCHELL INC.

Third and Somerset Streets

PHILADELPHIA 33, PA.

Paper Products for the Wire Industry

TWISTED • FOLDED • PRESSED • CRUSHED • SHAPED • BRAIDED • WOVEN

Just like having your cake & eating it!

OUR *NEW* COATING COMPOUND C-220 GIVES YOU BOTH . . . .

A Chemical and Mechanical Coating in One Operation!

● **OTHER ADVANTAGES:**

Will not pick up moisture
Acts as lubricant and rust-preventive
Adaptable to both coil and strand coating
Longer die life insured
Results in better finish
Requires no baking
Low concentration
Minimum drag-out
No critical temperature or concentration control necessary

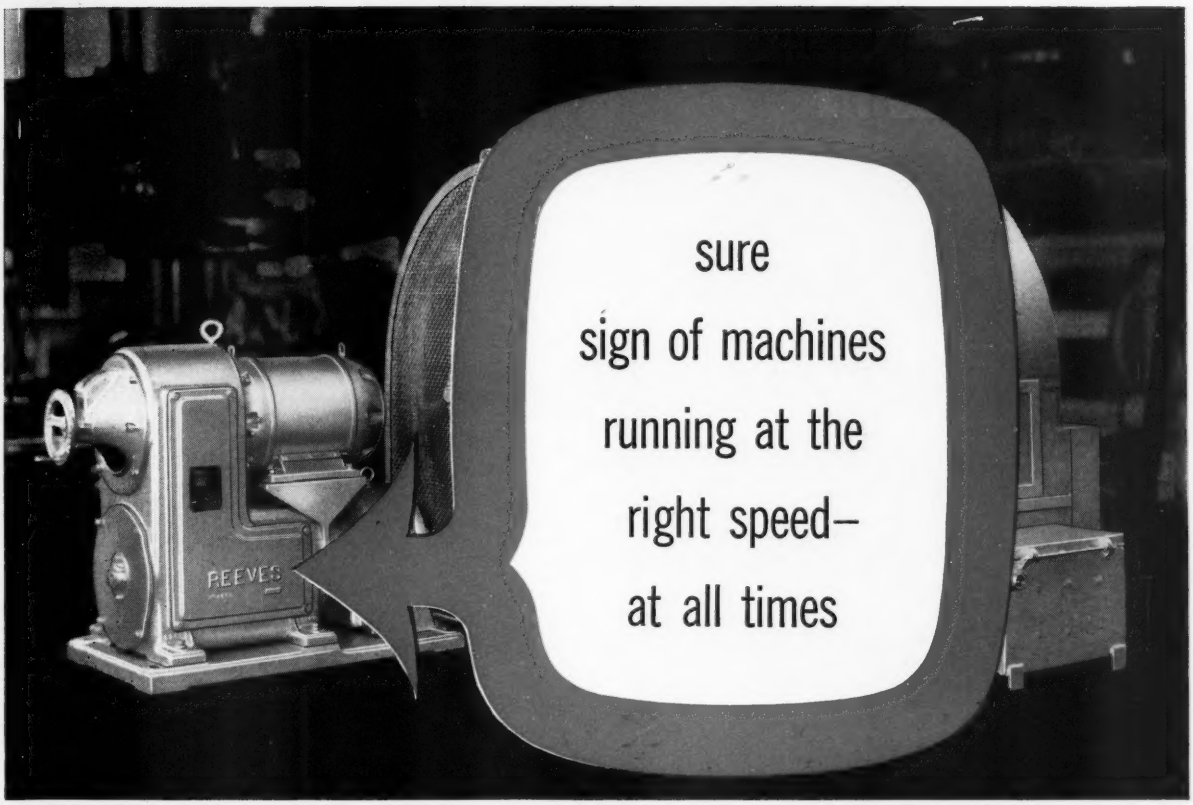
ALL RESULTING IN GREATER OPERATING ECONOMY

Performance Proven in Mills Today. *Drop us a line for a demonstration.*

APEX ALKALI PRODUCTS COMPANY

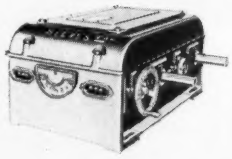
Lubricants & Cleaning Compounds for Wire and All Wire Products

Main and Rector Streets · Philadelphia 27, Pa. · IV 3-3939



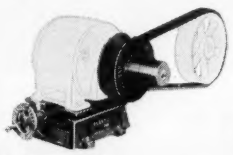
Reeves Variable Speed Drives

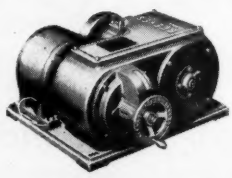
Reeves makes America's only complete line of variable speed drives —not 1, but 3 types to choose from



VARIABLE SPEED TRANSMISSION: Provides stepless speed adjustability over a wide range—as high as 16 to 1; sizes to 87 hp. Vertical or horizontal designs—open or enclosed.

VARI-SPEED MOTOR PULLEY: Converts any standard, constant-speed motor to a variable speed drive. Speed variations up to 4 to 1. Sizes to 10 hp.





VARI-SPEED MOTODRIVE®: A complete variable speed power plant. Combines any standard, constant-speed motor, REEVES speed-changing mechanism and gear reducer in one, compact unit. Sizes to 25 hp; speed ratios as great as 10 to 1.

Machines equipped with REEVES Variable Speed Drives . . . have a wider work range, handle more different shapes, sizes, and materials . . . because REEVES *always* provides the accurate, infinitely variable speed adjustability that is the key to efficient production.

With the turn of a handwheel, touch of a button, or automatically—*without stopping the machine*—you can change the speed to meet the need of every operation, every operator, and every operating condition. The result is higher rate of production and improved, uniform quality—at lower cost.

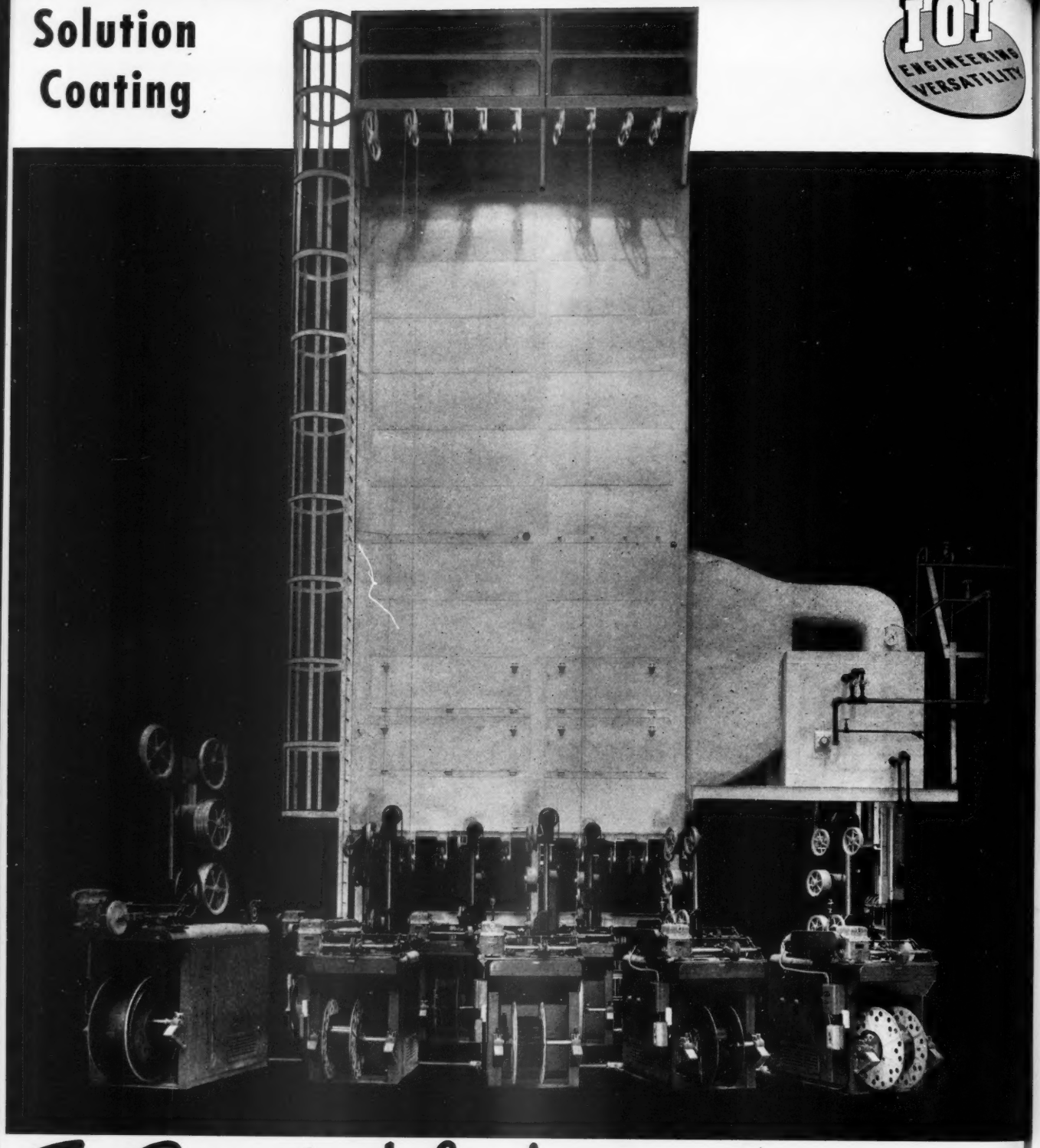
For machines now in service and the new ones you plan to buy, standardize on REEVES. Proved in 300,000 successful installations . . . available to you in a wider range of designs, sizes, speed ratios, and controls than any other make of variable speed drives. Send for free catalog No. WP81-G.

REEVES PULLEY COMPANY · COLUMBUS, INDIANA

Recognized leader in the specialized field of variable speed control

accurate · variable
REEVES *Speed Control*

Solution Coating



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The Recognized Leader IN CABLE AND WIRE

LACQUERING MACHINERY AND EQUIPMENT

For Solution Coating with Lacquer, Enamel, Polyvinyl, Teflon and Nylon

INDUSTRIAL OVENS, INC.

13825 TRISKETT ROAD CLEVELAND 11, OHIO

Wear at the bottom of wire drawing blocks has always been a high maintenance charge.

On heavy bull blocks we have tackled it by the fitting of replaceable hardened steel inserts at the point of maximum wear—a group of blocks so fitted is shown here.

On other types of machines where this wear is serious we have taken other effective steps to reduce the incidence of maintenance costs—and lowered production —from this cause.

RICHARDS MACHINE CO. INC.

1100 SOUTH BROAD STREET · TRENTON 10 · NEW JERSEY

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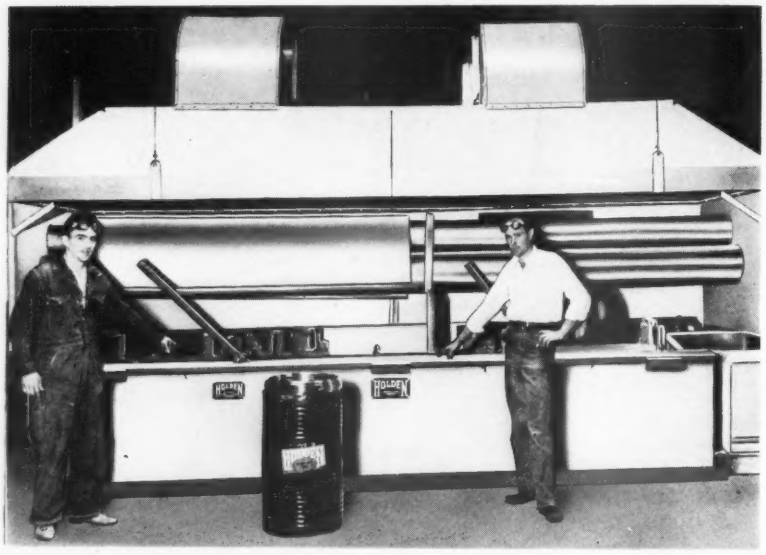
HOLDEN FURNACES AND SALT BATHS

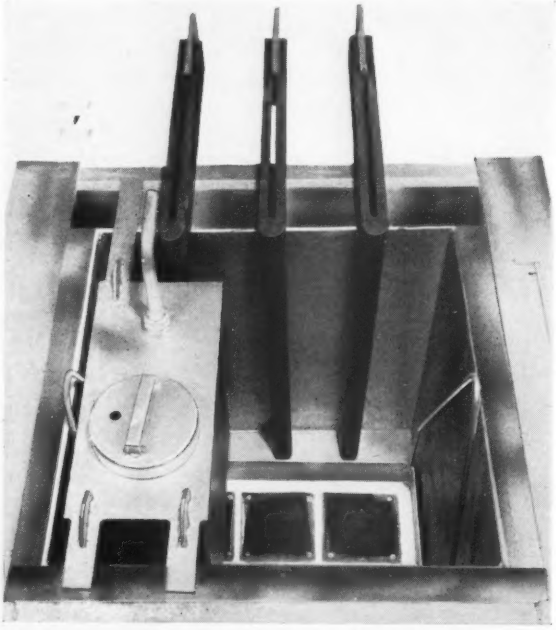


Strand Annealing Furnace for wire to produce bright finish.
For steel and alloy wires.
Process: Annealing or wire patenting.

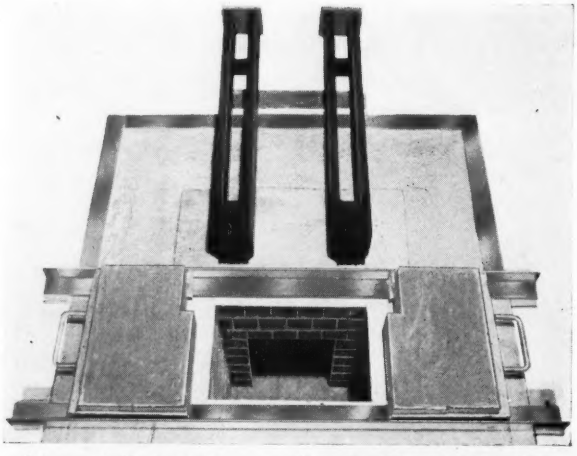
Replaceable electrodes with split shanks for increased electrode life, for any over-the-side units with steel or ceramic pots.

GUARANTEE:

HOLDEN Salt Baths are *guaranteed* in any type of furnace using steel, alloy or ceramic pots. We will assume manufacturer's guarantee in proven designs.



Small Sodium Hydride Furnace for experimental work on small wire coils—built in sizes from 36" by 36" by 36" to 20' long x 5' deep.



Submerged Electrode Furnace with replaceable electrodes. Built in sizes from 12' long x 8" wide x 28" deep to 20' long x 3' wide x 6' deep.

THE A. F. HOLDEN COMPANY

P. O. Box 1898
New Haven 8, Conn.

11300 Schaefer Highway
Detroit 27, Michigan

NON-FERROUS DIVISION TAKING SHAPE

The Wire Association is organizing a new Division to meet the requirements of producers of non-ferrous rods and wire and insulated wire and cable.

If you are engaged in the manufacture of non-ferrous rods, wire or wire products, or are making electric wire and cable, this development will be of special significance to you.

The Division will have its own committees, section chairmen, etc., and will devote its efforts particularly to the production problems of this division of the wire industry.

HOW IT STARTED

Various members of the Wire Association have been urging for several years that a Non-Ferrous Division be set up so that the interests of this important part of our industry could be served more specifically.

To this end a meeting was called in April, 1952, at which a committee was formed for the Non-Ferrous Division. At this meeting William L. Wells of the Scovill Manufacturing Company was named chairman of the Non-Ferrous Wire Section, and James E. Flood of the Plastic Wire and Cable Corporation was named chairman of the Electric Wire and Cable Section.

WHAT WILL BE DONE

Plans have been completed for the holding of a first Non-Ferrous Regional Meeting in Waterbury, Conn., at the Elton Hotel, on September 19, 1952.

At this meeting registration will take place in the morning, with a technical session starting at 10:30 a.m. There will be two papers, one on wire drawing and one on insulated wire.

At 1 p.m. busses will leave the hotel for a tour of the Scovill Manufacturing Company's mills and casting shop. Guests must go by bus and wear their badges. From 5 to 6 p.m., guests will enjoy a cocktail hour. Dinner will start at 6 p.m., following which the gathering will be addressed by a prominent non-ferrous man on a non-technical subject of interest to all.

The plan is to wind up the meeting at 9 p.m. to allow members and guests to get back to their homes in good season. All men in the wire industry are welcome to attend the conference.

WHAT YOU SHOULD DO

The success of this section and of this first meeting will depend upon the wholehearted support of the movement by all non-ferrous men.

You are therefore cordially invited to attend this meeting. We hope you will become a member of the Wire Association, support the good work and participate in the divisions activities.

Further details will be published next month in WIRE AND WIRE PRODUCTS.

If you are not a member of the Association now please write for an application card today.

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 MAIN STREET **STAMFORD, CONNECTICUT**

"Increased Production ...Improved Quality"

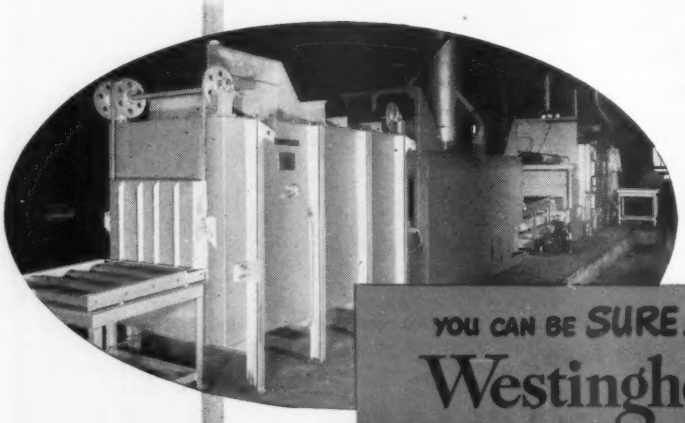
...says large tool company

"Stepped up production and improved the quality of our products," says a large tool company of this Westinghouse electrically heated, gas carburizing furnace. Steel parts . . . of a wide variety of shapes and sizes . . . are carburized, quenched, washed, drawn and discharged. Operation is straight line and completely automatic.

The result: Precise, *uniform* carburization of all parts, faster operation, and elimination of bottlenecks caused when trays must be manually removed.

A Westinghouse gas-fired Endogas generator provides the proper, safe controlled atmosphere. In addition, all auxiliary equipment is also Westinghouse, including motors, controls and material handling equipment . . . ***a complete "packaged" installation from a single source.***

Gas-fired or electric, there's a Westinghouse furnace to meet every heat-treating need. Westinghouse Electric Corporation, Industrial Heating Works, Meadville, Pennsylvania. J-10369



IF YOUR PRODUCT CALLS FOR HEAT-TREATING . . . IT CALLS FOR A WESTINGHOUSE FURNACE . . . GAS OR ELECTRIC

YOU CAN BE SURE... IF IT'S
Westinghouse
HEAT-TREATING FURNACES

STAYS BRIGHT AS DAY!

STANDARD'S NEW BRIGHT WIRE COMPOUND

STANDARD INDUSTRIAL COMPOUNDS COMPANY has pioneered most of the outstanding contributions to better wire drawing through better lubricants. Consult with STANDARD for the solution of your difficult problems. We welcome your inquiries.

FOR DRAWING COPPER-COATED WIRE

QUALITIES

- **A** Draws well
- **B** Makes exceptionally bright wire
- **C** Finish *remains* bright
- **D** Long lasting. Can be cut back with water when heat of drawing thickens it.

Write home office or contact one of our sales engineers for further details.

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Standard Industrial Compounds Co.
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wire drawing lubricants **Standard** INDUSTRIAL COMPOUNDS CO., INC.

4600 WEST FERDINAND STREET
CHICAGO 44, ILLINOIS

FOR TOP ADVERTISING VALUE

ADVERTISE IN OCTOBER, THE CONVENTION ISSUE OF WIRE AND WIRE PRODUCTS

All advertisers have been written regarding their OCTOBER CONVENTION ISSUE advertising. This is a further reminder to plan your special convention advertising early. If you are not now advertising, the October issue presents a splendid opportunity to get your products and your name prominently before the wire industry.

The annual convention of the Wire Association is in Cleveland this year — November 10th through the 13th. It will be a big and important meeting for both the ferrous and non-ferrous branches of our industry, including in the latter the manufacturers of insulated wire and cable.

WHO SHOULD ADVERTISE

Every manufacturer of machinery, equipment, supplies, rods and wire should be in the OCTOBER CONVENTION ISSUE with impressive space. Many have already ordered it. But to those who have not, we urge immediate consideration of your advertising question to take advantage of the unusual advertising values offered. These are long life of the issue, high readership interest and extra circulation.

We want to see you represented in October! If you want more information, rates, and so forth, please write us today. Don't miss this golden opportunity to cash in on a big event.

WIRE AND WIRE PRODUCTS

J. E. Donnellan, Vice President

453 MAIN STREET **Tel.: Stamford 3-0482** **STAMFORD, CONN.**

for ease of operation...
economical production

use **Pittsburgh**
COLD HEADING WIRE

You get trouble-free service from your cold heading machines —more economical production with Pittsburgh Wire. It feeds smoothly into your dies because of its uniform size. It forms readily in upsetting, extruding, thread rolling, bending and flattening operations because it has the ductility and the correct lubricant you need for high quality production in your particular operation.

The precision control of quality at Pittsburgh Steel gives you sound wire, with the toughness you want in your finished product. The economy of Pittsburgh Wire will be reflected in both your production records and the quality of the items you produce. Specify Pittsburgh Steel Wire for all your cold heading and cold forming operations. For information write Pittsburgh Steel Company, Dept. WWP, Grant Bldg., Pittsburgh 30, Pa.

Pittsburgh Wire

A product of **PITTSBURGH STEEL COMPANY**

FINE WIRE

with an Extra Fine REPUTATION

● The wire you need in any fine-wire application is an important product-part. To save you time and money . . . and to help you turn out better merchandise, Continental backs up its enviable fine-wire reputation with honest, helpful service. You have only to tell us your problem, and we will recommend or make the wire you need. Continental has a satisfied-user record built by years of giving service with every wire sale. You'll like Continental and Kokote wire and, like so many other users, you'll appreciate Continental wire service. Write us at Kokomo, Indiana about your wire problem.

Trade Marks Reg. U.S. Pat. Off.

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

After stoning, four grades of ELGIN DYMO are used for mold polishing at KURZ-KASCH, INC. of Dayton—grades 45, 14, 6 and 3 in that order. The work piece is carefully cleaned after each operation and, as shown, separate applicator guns are used for each grade of DYMO

They get finer finishes faster with

ELGIN DIAMOND

...AT KURZ-KASCH, INC., leading Dayton, Ohio, plastic molder...where mold finishing is a vital operation from the cost and sales standpoints. You can be certain of higher quality finishes, and at less cost too, with Elgin Diamond—completely processed at Elgin to assure uniform, predictable polishing results day after day with maximum cutting speed. That's why the leaders in almost every field where finish is important...

Finish with Diamond ... ELGIN Diamond!

DYMO | **DYMO-C**

...FOR GENERAL POLISHING | ...FOR CARBIDES

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ELGIN NATIONAL WATCH COMPANY

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For the FINEST Dies...

Specify

DIES... TOOLS... WEAR PARTS... BLANKS...

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IN CANADA: (TOOLS) CARBIDE TOOL CO. W. Toronto 9, Ont. (DIES) VASCARB TOOL & DIE CO. Hamilton, Ont.

The Wire Outlook

While the Supreme Court's decision on the seizure of the steel industry made history and gave the country a breathing spell from the constant boring-from-within efforts of the proponents of a "planned economy", it is more than probable that an agreement would have been reached without a strike had not the Wage Board not only encouraged the C.I.O. in its hopes, but come out with a "package" settlement recommendation in excess both of labor's expectations and of reason.

More strikes, the loss of many millions of tons of steel and inflation are the price the country will have to pay for having an officious, biased bureau meddle in an affair that should and could have been settled by the contracting parties. In fact, it is one more inflationary increment resulting from the long series of un-American tactics on the part of two Administrations that for too long have been abusing the powers entrusted to them by the electorate.

However, the Administration's efforts to exceed its powers has had the beneficial effect of bringing about a clearer definition and limitation of executive powers and of restoring to us the checks and balances between the different branches of the Government—legislative, executive and judicial—that our constitution intended should be maintained.

The desirability of not buying for inventory has been clearly indicated in the three price cuts on zinc, since Prime Western grades dropped to 16 cents at St. Louis. The NPA has authorized the purchase of up to 50,000 tons of foreign copper per month. Its present plan is to allocate 80,000 tons of domestic copper and authorize buyers to purchase the copper of foreign origin. Copper consumers don't believe, though, that there is more than 35,000 tons of copper that can be expected from import sources.

Getting ready for election day, a boom is getting first consideration in Government planning. Spending is being speeded, lending is to be encouraged and controls that are irritating too many voters are to be eased. The trend of business is definitely up, although most manufacturers are not too optimistic about 1952 and expect sales totals to fall below 1951 and net profits to be reduced sharply.

Deferments and cancellations in wire orders have fallen off and new wire buying has been spotty. Self-certification on small orders should lead to additional buying and enable the mills to schedule production in a more orderly manner.

For the most part common nails have been in good supply, with the specials somewhat tight. The demand for fencing nails and most wire products is good. Bed spring and upholstery wire demand has shown improvement. Wire rope orders are numerous, but small, except for military purposes. Bolt and nut demand has eased so that orders are generally being filled promptly. On the heavier types for construction, shipbuilding, etc., the demand is brisk. The standardization of fastener sizes—square and hex bolts and nuts—by the ASA, if industry cooperates will lower costs and make for lighter inventories. This will benefit both the manufacturer and the consumer. In spite of the losses due to the steel strike, rods are still generally plentiful.

For next year, there is expected to be plenty of building, plenty of steel, more aluminum and lots of competitive selling. The building boom, due to relaxed credits, will take a great variety of materials, making for widespread good business.

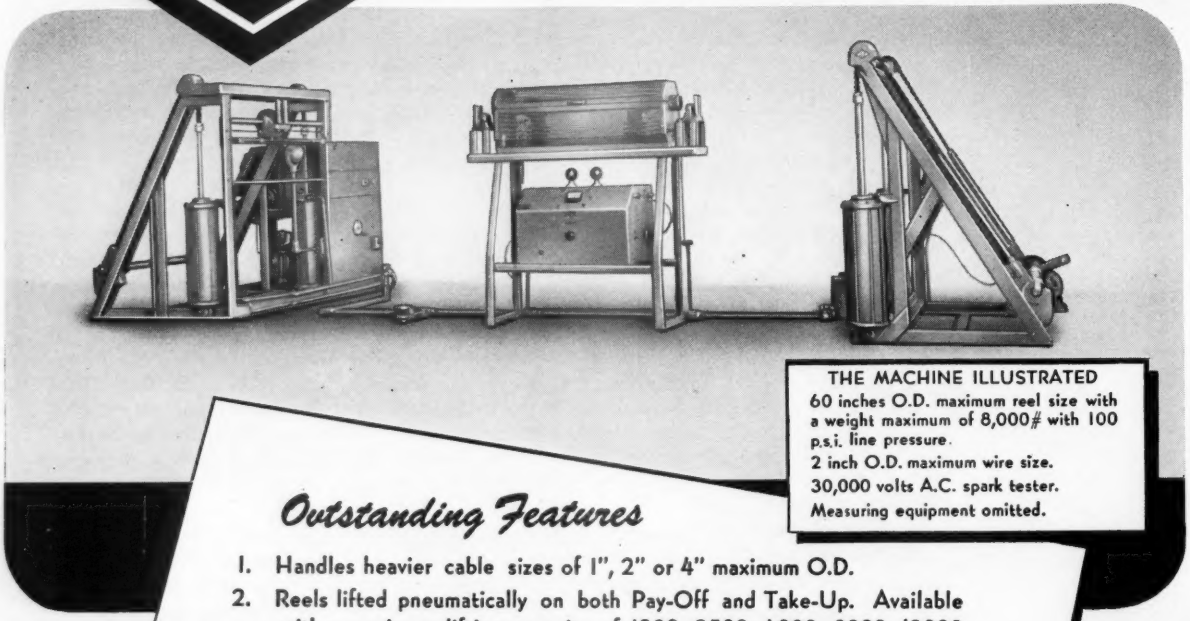
To assure a sound economy, however, we must have new faces in Washington next year. The type of pump-priming being indulged in now will only result in an ultimate crack-up that will make all others seem moderate by comparison.

—from the Editor's Desk

HEAVY DUTY *Automatic*

Re-reeling, Spark-testing & Measuring Equipment

... for insulated wire & cable



THE MACHINE ILLUSTRATED

60 inches O.D. maximum reel size with a weight maximum of 8,000# with 100 p.s.i. line pressure.
2 inch O.D. maximum wire size.
30,000 volts A.C. spark tester.
Measuring equipment omitted.

Outstanding Features

1. Handles heavier cable sizes of 1", 2" or 4" maximum O.D.
2. Reels lifted pneumatically on both Pay-Off and Take-Up. Available with a maximum lifting capacity of 1,200, 2,500, 4,000, 8,000, 12,000 or 18,000 lbs. at 100 p.s.i. line pressure.
3. Synchronized pneumatic braking on both Pay-Off and Take-Up.
4. Available in four frame sizes for 48, 60, 72 or 84 inch maximum reel diameters.
5. Spark-testing voltage range: 15,000, 30,000 or 50,000 volts A.C. or 20,000, 40,000 or 80,000 volts D.C. maximum.
6. Adjustable, air reversed traverse mechanism.
7. Centralized lubrication system furnished.

Ask For CAT. SEC. 2G

Following drives are available:

1. Single constant-reel-shaft speed.
2. Variable constant-reel-shaft speed.
3. Variable constant-wire speed.

See Page 703 for a complete listing of JLE Products for the Insulated and Bare Wire Industry

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WIRE
AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 27 JULY, 1952 No. 7

THE PITTSBURGH REGIONAL MEETING

Another memorable Regional Meeting is now recorded in the annals of The Wire Association. This meeting, held at the William Penn Hotel in Pittsburgh, Pa. on May 8 and 9, 1952, proved not only exceptionally interesting from the standpoint of the technical sessions, but in its other affairs, the banquet, the plant inspection trips, was highly worth while.

★ ★ ★

The Pittsburgh Regional Committee did a splendid job and the appreciation of the directors, officers and members who attended are grateful to **Tom M. Girdler, Jr.,** Union Drawn Steel Division of Republic Steel Corporation, Chairman, to **C. Raymond Harmon,** Firth Sterling, Inc., Assistant Chairman, and to the committee members, **C. W. Garrett,** Jones and Laughlin Steel Corporation, **C. H. Williams, Jr.,** Pittsburgh Steel Company, **George Tescon,** Pittsburgh Steel Company and to **E. W. Hill, Jr.,** Russell, Burdsall and Ward Bolt and Nut Company, who served as chairman of the technical session.

★ ★ ★

A total of 243 persons registered for the convention.

Wire Association Seats New Directors and Officers

The Board of Directors met on the morning of May 8th for their regular semi-annual meeting with President Fred M. Crapo presiding. After the roll call two new directors were formally seated: Tom M. Girdler, Jr. of the Union Drawn Steel Division, Republic Steel Corporation, Beaver Falls, Pa., and William L. Wells of the Scovill Manufacturing Company, Waterbury, Conn. Following this Executive Secretary Richard E. Brown read the minutes of the last meeting and made the semi-annual report of the Secretary-Treasurer. Both reports were approved as read.

★ ★ ★

President Crapo called for reports from the Annual Convention Program Committee. General Chairman L. C. Crewe, Jr. reported on the status of the Ferrous Division's program and Non-Ferrous Division's was reported on by L. C. Whitney, chairman of that section. A complete, well-balanced collection of technical papers have been arranged for that will provide the Convention in Cleveland this year with a better than average series of subjects. Mr. Girdler then presented a report on the Pittsburgh Regional Meeting, calling attention to a number of changes that were necessitated by the steel industry seizure. Mr. Patton, who was scheduled to make the after-dinner address, had been replaced by Mr. Hamacher and the Pittsburgh Steel plant visit, because it was not operating, was replaced by one to the Townsend Company. The program in most other respects was unchanged.

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Mr. Brown, in the absence of K. H. Davis, Chairman of the Los Angeles Regional Meeting, reported that the meeting there would be held on June 13th and described the meeting that had been arranged for, after which W. L. Wells, Chairman of the newly formed Non-Ferrous Division reported on the work that has been done to organize this division, which will embrace the non-ferrous wire and the insulated wire people. A first non-ferrous regional meeting is tentatively planned for September in New England.

New Officers for the Coming Year

The next order of business was the seating of the officers who had been elected by a mail ballot of the Association's members.

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The men who will head the organization are John A. Moritz, Keystone Steel and Wire Company, President, Leonard C. Crewe, Jr., Maryland Fine and Specialty Wire Co., Vice-President Ferrous Division, Ralph B. Roth, Ludlow-Saylor Wire Company, Vice-President, Non-Ferrous Division and Richard E. Brown, Executive Secretary-Treasurer.

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After some discussion it was voted that the Annual Convention in 1954 be held in Detroit and that

regional meetings be held in Canada and San Francisco in the Spring of 1953.

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President Crapo proposed some amendments to the present By-Laws. First, to extend the term of a president to carry through the Annual Convention so that he would be able to preside at a convention he has helped to promote. Another point was to increase the number of directors from 14 to 18 and provide that officers shall be elected from among the Board's membership. A further suggestion was made that officers be elected at the Fall meeting instead of at the Spring meeting and that these shall assume their duties at the Fall meeting. Finally it was proposed that after a president has served all or part of his tenure of office, he shall automatically become a Past President. Mr. Crapo submitted these changes in writing and they were adopted unanimously. The Secretary was instructed to submit these to a mail vote on the part of the membership immediately.

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Before adjourning the meeting a motion was made and seconded expressing the thanks of the Association to Mr, Girdler, Mr. Harmon and their committeemen for the fine program they had arranged for the Pittsburgh Regional Meeting. A vote of thanks to outgoing President Crapo for his fine leadership was also placed in the minutes.

The Start of Meeting Activities—Visit to the Firth Sterling Plant

The first important official function on the program was the visit to the Firth Sterling McKeesport plant the afternoon of May 8th.

Group of Visitors at the Firth-Sterling Plant.

One hundred twenty-eight members and friends of the Association took advantage of this opportunity to witness first-hand the various processes involved in the manufacturing of tungsten carbides and finished carbide products.

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The route was so arranged that the group was able to see a good portion of Pittsburgh's heavy steel industry, including Jones & Laughlin's new South Side installation, Mesta Machine's works, and the Homestead, Duquesne and McKeesport Works of U. S. Steel.

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Upon arrival at McKeesport, each group was personally greeted by the Carbide Plant Manager, who explained briefly the various operations they were about to witness, which contrasted greatly with the processes used in the manufacture of steel.

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The tour of the plant was so arranged that the visitors could see each operation in proper sequence, which included:—

1. Raw Ore Conversion—where raw ores are converted to ammonium paratungstate, then to tungsten tri-oxide and finally to pure tungsten powder.

2. Ball Milling—Tungsten powder plus a calculated amount of carbon is physically mixed preparatory to carburizing.

3. Carburizing—where the mixture is heated in graphite crucibles to form the chemical compound, tungsten carbide.

4. Powder Preparation—here tungsten carbide with proper amounts of cobalt, tantalum carbide or double carbides are ball milled for thorough and uniform mixing.

5. Cold Pressing—granulated powder flows from a hopper into automatic presses where nibs and blanks are completely formed, ready for further processing.

6. First Sintering—pieces as received from the press room are heated to strengthen the material so that it can be further worked.

7. Shaping—half sintered pieces are machined to desired shape by grinding or machining. Allowance is made in all dimensions to compensate for shrinkage, which occurs in final sintering.

8. Final Sintering—Hydrogen—Pieces are packed with fine alundum in graphite trays and stoked through furnaces with a hydrogen atmosphere at temperatures ranging from 2400° F. to 2900° F.

Vacuum pieces are packed on graphite trays and loaded in specially constructed furnaces and sintered by induction heat in a vacuum.

In the sintering operation, the binder cements the carbide particles together to form a hard dense material.

9. Quality Control and Inspection—all material is carefully checked for quality and inspected at various stages of manufacture to insure a "controlled quality" product.

10. Casing Forging—a rotary hearth furnace and controlled atmosphere is used to heat the casing prior to forging in a large hydraulic press.

11. Casing Finished—the rough dies are turned between live centers to assure concentricity and coaxial alignment.

As each group finished the tour of the plant, soft drinks were served by two very pretty female employees.

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The tour of the plant appeared somewhat strenuous to some of the visitors, especially a certain Southern gentleman who was later afflicted with a case of "hot feet".

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After completing the plant tour, the visitors were then taken by bus to the company's main offices and research laboratory at Pittsburgh.

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Here the company's research and pilot plant facilities—one of the most modern in the country devoted to carbide research and development—were explained in detail.

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The newly established Central Commodity Stock Department was also visited by the guests.

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The Method "X" process, marketed by the Method X Company, an affiliate of Firth Sterling, proved of great interest to most of the guests. This electro-mechanical process of removing metal makes difficult machining operations easy and impossible jobs, possible. It opens new fields for development and can be of great help to the wire drawing industry, particularly where intricate shape dies are involved. Considerable time was spent in discussing its operation; in fact, a couple of busses were delayed in returning the group to the hotel, awaiting those who got "lost" in Method "X".

The Banquet

From six to seven P. M. in the evening the members and guests were served cocktails through the courtesy of the R. H. Miller Company and the Standard Industrial Compounds Corporation, with the heads of these companies, Van Miller and Chuck Orr as the genial hosts, as of yore.

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Following this the assemblage, 253 strong, went into the Pittsburgher Room to attend the banquet. After dinner a very interesting and entertaining act was put on, which appeared to be much appreciated. The speaker of the evening, L. S. Hamacher, Assistant General Sales Manager of the Republic

Steel Corporation, delivered a talk that had been prepared by Thomas Patton, the company's vice-president and general counsel. Mr. Patton was unable to deliver his talk because of the strike situation's requiring his presence in Washington. Mr. Hamacher, as those who have heard him before might expect, did a fine job, pointing out that in the seizure of the industry our very freedom was at stake and that, granting the handing down of a proper decision and the enactment of new laws, some good could come out of the action. Door prizes were awarded at the close of the banquet, the fortunate winners being given a set of golf sticks, a golf bag, single golf sticks, and a brief case.

Friday, May 9th

The technical session began bright and early with a fine paper, "The Drawing of Aluminum Wire" by Joseph Urbanik, Plant Superintendent of the Kaiser Aluminum and Chemical Company, Newark, Ohio.

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This was followed by a second paper "The History and Development of Planetary Thread Rolling" by Howard D. Prutton, D. H. Prutton Machinery Company of Cleveland, Ohio.

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The last feature was a symposium on "Mechanical Cleaning of Rods and Wire" with William Baldridge of the Laclede Steel Company serving as moderator and Floyd Hauger of Standard Industrial Compounds Co., E. T. Miller of Firth Sterling, Inc., and Douglas Harvey, Northwestern Steel & Wire Co., as panel members.

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The papers and discussions thereon, all of which proved most interesting and informative, are published elsewhere in this issue.

Plant Visit to the Townsend Company

As a climax to the meeting, more than 140 members motored to the New Brighton plant of the Townsend Company for a tour of those operations. Four busses carried the Association members to the plant, located 30 miles north of Pittsburgh, where Townsend foremen and engineers were on hand to conduct separate parties through 15 acres of Townsend production departments.

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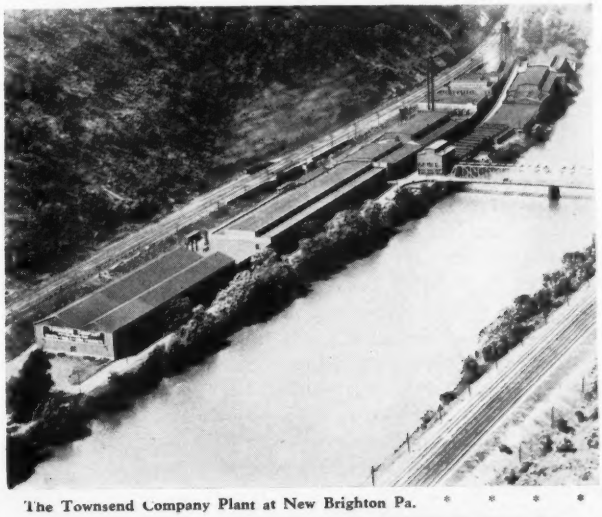
Townsend Company is a 136-year-old manufacturer of wire, rivets, locknuts, nails and other industrial fasteners. They have occupied the

(*Please turn to page* 709)

A View of the Wire Mill of the Townsend Company.



The Townsend Company Plant at New Brighton Pa.

Some of the Guests of the Townsend Company.

SYMPOSIUM: MECHANICAL CLEANING OF RODS AND WIRE

MODERATOR

William M. Baldridge, Research Engineer
Laclede Steel Company, Alton, Ill.

PANEL MEMBERS

E. T. Miller, Supervisor Wire Die Sales, Firth Sterling, Inc., Pittsburgh, Pa.

Floyd M. Hauger, Vice Pres., Standard Industrial Compounds, Chicago, Ill.

Douglas Harvey, Asst. Gen'l Supt., Northwestern Steel & Wire Company, Sterling, Ill.

This symposium, held at the Pittsburgh Regional Meeting of the Wire Association on May 9, 1952, treats of a subject that has been giving many rod and wire men considerable to think about. While in its infant stages, the mechanical cleaning of rods and wire will probably be developed to a point of great efficiency in the years to come.

CHAIRMAN HILL: Our second portion this morning deals with a subject which has attracted world-wide interest of all wire mill men. The subject of course is descaling mechanically. I recall a story of a wire mill superintendent who suddenly died. At the Pearly Gates he was told by St. Peter that there was permanent room for no more men of that profession. After obtaining permission for a slight visit, he rumored it around that Satan had developed a new descaling machine and Heaven soon lost a great many wire men. Then our hero was granted permanent residence. But was he happy? Indeed not! In a few days he left with the statement: "I have to get out of here; there may be something to that story of mine after all."

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Gentlemen, our distinguished and intelligent panel, who would probably prefer to have the discussion before they even give their little talks, with their genial host, **Bill Baldridge.**

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MODERATOR BALDRIDGE: Well, gentlemen, this is probably going to be one of the most informal sessions that the Wire Association has ever had. It may never be the same after this. The only formal part about it is I will introduce the panel. It is **Ed Miller** of **Firth Sterling** and **Floyd Hauger** of **Standard Industrial Compounds.** Now **Doug Harvey** is in Pittsburgh some place, that's all we know. He may show up later.

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It gets down to this on this descaler, that everyone has a different reason to get into it. We were more or less forced to get into it, we couldn't get acid and it was a question of descaling mechanically or else stop making wire. It has a lot of bugs in it. Well, we are a million miles from home and what we think is right today may be dead wrong six months from now. But we have tried some things, and some were good and some didn't work out so well.

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I think on this descaling business a lot is going to depend on the individual mill, the type scale they have, and things like that. It happens that we have a rather brittle scale that breaks off fairly easily, and of course that is a big help on mechanical descaling. These people with these soft fluffy scales are going to have more trouble. We feel when we get about 99 per cent of the scale off of the rod and that little powder carries through; of course, that is what these fellows have been working to overcome. So I think it would be better if we could put a little drawing we had on the screen. A lot of people have an idea that these descalers are very elaborate. They are not. It is just a question of breaking the rod over a couple of sets of rolls in two planes and then you are on your own from there on.

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(Slide) That gives you the idea. You have these three rolls here, which are adjustable. That is mainly because you will hit a certain heat of rods where you have to have more or less flexing to break off the scale. So that would be adjustable. And in the next three rolls on the other plane, it is this thing duplicated but the other way. Also it makes it much easier if you are going to thread a roll with high carbon to screw up this center roll and then screw it down, and that's all there is to it. You can spend a lot of money on one of these things or you can spend only a few dollars; that is up to each mill.

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We are not going to have a lot of formal talking. I would like to have Ed and Floyd make a few remarks and then we are going to throw the thing wide open. I won't say we are going to answer all your questions, but will do our darnedest. Ed, will you lead off, please?

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E. T. MILLER: I am glad this is an informal meeting. I feel a lot better before the Wire Association today than in 1948, and I think I

knew a whole lot more about what I was talking about in 1948 than what I am talking about today.

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When this Committee met in Chicago in January we proposed to investigate by test, difficulties we are having with mechanically descaled rods as compared with acid pickle-cleaned rods, also tests of various designs, angles, bearing linings and nib sizes on mechanically descaled rod drawing. Under the circumstances, insufficient time has elapsed to determine with authority exact results of these tests, considering the many variables that were encountered.

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Much to the surprise of most of us, evidence points to the possibility of just as good die wear with mechanically descaled rods as with acid pickle-cleaned rods and **possibly better.** And I have underscored these last two words here, debating whether or not to say them but I'm going to. Possibly better die life with mechanically descaled rods than with acid cleaned rods. My reason for saying that is this:

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In my experience in the wire mill we haven't always had well-cleaned acid pickled rods. And when I say possibly better die wear, I mean from an over-all average cleaning job. I think with mechanically descaling we will not encounter as many rods that are not well cleaned. Either you clean them or you don't clean them. If they are not cleaned they won't run, and if they are clean they will run well. And that is my theory of the possibly better die life.

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Now rather than give a prolonged report on tests that were run in the early stages of the investigation, I want to tell you what is regularly being done at present on drawing mechanically descaled rods. These reports here are authentic; they are based on actual tests.

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Drawing low carbon mat wire for electric welding, three holes, 10 at 700 feet per minute, averaging approximately 75,000 pounds of wire with each set of dies.

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Drawing green high carbon four holes, 12 at 700 feet per minute, averaging approximately 10,000 pounds of wire per set of dies.

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Drawing low carbon wire for galvanizing, four holes, 119 at 800 feet per minute, 65,000 pounds of wire per set of dies.

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One of the early things we learned about angles in the dies was the necessity of a larger angle than normally used in the first die. We have used successfully dies with 20 degree included angle, as well as 24, 28, and 30 degree angles. The proper angle to us will probably be dictated by the finish required on the finished product. I am reluctant to make this next report, but have been urged to do so by the other members of the panel. We ran two tests identically alike except for die design. We have not run any other tests comparable to this and consequently haven't exhausted all the possibilities with this test. We ran the one test first and then changed the design of the dies and ran the second test, and we haven't investigated yet further than that. Primarily for thought among you people who probably will be experimenting with this later, this is the report:

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Drawing high carbon wire processed at .118, .60 carbon, .80 manganese, at 1300 feet per minute, drawing it six holes to .041, we use .098, .080, .076, .056, .047, and .041 dies. This is our first test. The .098 die had a 16° included angle and 50 per cent bearing length; in fact, all were 50 per cent bearing length. The .080 had 14°, the .076 14°, the .056 had 14°, the .047 was 12°, and the .041 was 12°. As all of these dies were made very carefully, we are positive of the bearing length and the angles. We ran 1,361 pounds of this wire through this set of dies.

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Then we changed the dies, with everything else identical, with the exception of the new set of dies. This set of dies, the .098 had a 20° included angle, the .081 had a 16° angle, the .076 had a 16° angle, the .056 had a 16° angle, the .047 had 16° angle, and the .041 had a 12° angle. All of the dies had a 20 per cent bearing length. This set of dies drew 4,100 pounds of wire and then were worn out. We don't know why. That is why I have been reluctant to make this report. We believe the die design probably has a lot to do with the success of drawing mechanically descaled rod.

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We felt that perhaps the short bearing decreased the friction and the heat and possibly got more lubrication through the bearing of the die, which would be responsible for the extra die life. However, it may have been something else, we haven't exhausted this test.

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MODERATOR BALDRIDGE: Floyd, would you make a few remarks on the lubrication angle of it?

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FLOYD HAUGER: Originally I intended to speak off the cuff, because that is about what we have been doing lately on lubrication. We think the last material always has the best possibilities. But in the lubrication of mechanically cleaned rod we find different factors than are present in the normal procedure.

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First, there is no whip present in the rod at the ripper die; it approaches the die in a straight line. This means that paste compounds as such cannot be used for extra bright or special finishes. Either semi-liquid compounds must be used or solutions must be pumped on the wire; that is, for extra bright finishes.

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Second, since there is less coating on the rod, the lubricant must be applied on each or at least every other hole.

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Third, any coating that is applied must be put on in boxes before the ripper die or be made a part of the lubricant.

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Fourth, the lubricant must be of such a grind that possibilities of channeling are eliminated. This is particularly true on rods to be drawn into wire to be cold headed.

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Certain facts have presented themselves at times when experiments have been run on descaled rods. These are as follows:

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First, the melting point of the fats used in making up the lubricants does not seem to be of too great importance, as we seem to get equal results with fats which have

a low melting point as those which have a high melting point.

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Two, the lubricant must be used as it has been prepared. In other words, free lime cannot be mixed in or added to the lubricant or scratching will take place.

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Three, certain additives show that they are definite aids in drawing. However, their value still has to be substantiated by further tests.

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Indications are that lubricants can be improved in the future as follows: One, the coating and lubricant will be used as one package; that is, together in the lubricant box so that only one material need be handled.

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Two, there are indications that the lubricant used should be somewhat richer in fat content, than on pickled or coated rods. However, there is a little argument on this point.

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Three, fats should be used which show a greater affinity for the base metal.

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Four, compounding must be made with a view in mind that the roll dust in the pits of the metal as opposed to regular scale dust, is floated into the lubricant film where, surrounded by the fat particles, the harmful effects are minimized.

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I think that we can probably develop more by actual discussion than we can by giving any more data, since there are changes being made every day in the lubricants we now are trying out.

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MODERATOR BALDRIDGE: Mr. Harvey do you have some remarks to make?

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DOUGLAS HARVEY: Very much so.

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I think we are all doing somewhat the same thing on the mechanical descaling of rods. We break our scale at Northwestern by passing it over two rolls, breaking it first one way and then the other. The primary difficulty of course is getting the coating on the rod at the ripper die, picking up the lime. The greatest success we have had on descaled rods drawn for nail wire was accidental. One day we left some rods out, got them rusty, and they ran very well. That was accidental. So apparently it is picking up the coating on your first die, picking up your lime, that seems to make the difference.

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The scale that we have there is a handicap. That is what takes your dies out. We have a problem in our wire mill of getting a heavy enough coating on the wire as our cutters start up in cutting nails. We have one department where they descale the rods for welded fabrication and they have just the opposite problem. they don't want any coating on the wire at all.

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I really can't add too much to it. We haven't found anything magic. Our die life isn't what it should be yet. Some days we have good die life, really comparable to our acid cleaned rods; other days we don't. The surface of the rod seems to have a great deal to do with the performance of dies. If you have any overlap or any fin or anything on your rods at all, you might be able to draw them on a clean setup, but when you get into descaling it takes that little bit of scale into your dies and you just can't draw it.

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MODERATOR BALDRIDGE: What we would like to do now is just kind of throw this thing open, and we will try to answer any questions.

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A Member: What are the largest sizes that you have done?

MODERATOR BALDRIDGE: John North, what was the size, .406, wasn't it?

MR. NORTH: .440, and it worked all right.

MODERATOR BALDRIDGE: We are not doing too much on this one hole work because we have a physical limitation in the way our machines are set in the mill and if we had a descaler on every box we wouldn't have enough room for a man to get in there and work. But it is just as easy on the big stuff as the small. In fact, I think a little easier.

A Member: How far down have you been able to go, 20½, something like that, on your rods?

MODERATOR BALDRIDGE: No, we haven't. Have you?

A Member: No. 13½. In other words, evidently the problem is to make your lubricant stay on your ripper hole to cover four or five?

MODERATOR BALDRIDGE: It seems so.

MR. HAUGER: We have gone seven holes on high carbon.

A Member: I would like to ask Mr. Harvey how in picking up lime, it was applied?

MR. HARVEY: We have tried it in several ways. We tried it first by rotating a drum around the rod with limestone, which would give somewhat of a coating. Finally we just went to a straight box and passed the rods through the lime.

A Member: Limestone or—

MR. HARVEY: Just regular ground-up powder lime. But you don't get enough coating on your first draft to carry it all the way through. You have to put your coating on each place.

A Member: I would like to ask Ed Miller, he mentioned 50 per cent and 20 per cent bearings, how do you measure bearings?

MR. MILLER: We didn't measure these bearings, we calculated to a meeting point and then finished the die from there. That is, we had a 90° back rate in the die and a 16° entrance angle, and we calculated the bearing length from the meeting point of the apex of the angle.

MODERATOR BALDRIDGE: Any other questions?

A Member: Have you tried air to blow off that one per cent you say is left, or remove it with wire brushes or something else?

MODERATOR BALDRIDGE: We have used air jets and we have tried drawing them through a triple box with a piece of limestone, and shock, and different things like that. That is about as successful as anything; the air does do some good. No, we have never tried the brushes. We feel that with a brush you are more or less burnishing that rod surface; it makes it a little smoother and you pick up less lubricant. Now that is just our opinion. We would rather have the rod rough.

But that is a problem, that getting off the last little one-half per cent or whatever it is, or else getting a lubricant that will go on through. And that is one thing that I think we are coming closer to every day. It is as Ed said, so much of this gets back to die design, on what kind of a finish you want to come up with. If you are going to knock down process stock that is going to be later patented, you just want to hang on something that gets through; if you want bright wire you want something at the tail end that you can take off.

A Member: You gave finishing speeds. I guess, on your wire drawing practice. Have you any figures on ripper speed? I think that is most important. And also power. Do you have any trouble with your power?

MR. MILLER: All of these were run on continuous machines and there was about, if I remember correctly, a 30 per cent reduction. So you could judge your ripper speeds by that. However, the whole set of dies wear out when they do go out. We didn't get the finished die wearing out and the rest good. Generally the set of dies wears out all down the line.

A Member: I have information from Continental that they are ripping on secondary finish at 700 feet a minute, with descaled rod.

MR. MILLER: Well, we don't. Our machines wouldn't run 700 feet a minute on the first hole.

A Member: This was a two hole job.

MR. MILLER: We haven't made any test on descaling on a double deck block that I know of.

A Member: This mechanical removal of scale of course takes the outside layer off. How about the oxide that is in the fissures of the wire, the seams, the lands and so

forth? Does it really get that out?

MODERATOR BALDRIDGE: That is pretty hard to answer, but probably not. What little is left can be eased through lubricants. Of course you have to clamp down on your rod, to get a pretty fair rod off the thing to start with. Fins play the devil with the job. If you have some overfills don't try to use descaler. We have had particular jobs hang up that had overfill and we couldn't do anything with them. If we take them back and pickle and lime them, they are all right.

MR. HAUGER: That is one thing we are trying to do also, flow out that last part of the dust, pull them out of the pits and get them up in the lubricant film. If we can do that they won't bother us any more. Because you surround the dust particle with a fat layer and your die wear is negligible and you won't have that trouble. As yet we haven't been able to do it to our own satisfaction, but we hope to.

A Member: You are talking about dies wearing out. How do you mean, wearing out? Wearing over-size, or are you getting pressure rings, or just what is the wear?

MR. MILLER: The finish dies were worn over-size. But all of them had healthy rings.

A Member: "If you have a pressure ring, doesn't that indicate you ought to have a longer section to cut down pressure as it hits that ring?

MR. MILLER: I think that is absolutely right. I believe that one of the things that would help immeasurably is light draft and a large angle on your first hole die, and then a tighter angle down the line. I think that that may help on this job where you are cold heading, and most cold heading is a one hole job. But I believe if you were to take a very light draft on your first hole and a tighter angle on your second hole, giving you a brighter finish, you would get rid of a lot of that smut and probably some of that scale off your wire. I haven't tried that, this is only theory.

A Member: Bill, I would like to ask Ed Miller what they have done on variation in nib height? Have you played around with that very much?

MR. MILLER: We have some. However, it sounds like commercializing and we stayed away from saying much about nib height. But I do feel that on mechanically descaled rods it will require a higher nib on the first die, then you are getting away with at the present time.

A Member: From what I have seen it doesn't bear out the statement that the dies wear out all along the line. It seems the ripper is almost indestructible and they wear out down the line. Perhaps I shouldn't say that but that is what I have seen.

MR. MILLER: I think perhaps that is a good statement. That bears out the fact that all things don't work alike in all mills. Most of the reports that I have given you have been reports taken from Laclede Steel. And I think perhaps you are talking about tests run at Pittsburgh Steel.

A Member: Yes, among other places.

MR. MILLER: And it has something to do with that too. I think we have a lot to learn about dies.

A Member: We have in our rods a free oxide, ferrous, ferric, anhydrous ferric. How about where your rods are stored outside and you pick up quite a little ferrous outside, with pitting, that won't break off with descaling?

MODERATOR BALDRIDGE: If a rod is rusted so badly it is pitted you have a devil of a time even pickling it; at least we do, and it won't break off very well. Just as Doug said, if you have just enough rust so that it starts to crack up, it makes a beautiful job.

A Member: Mr. Chairman, along that line I would like to say that last summer I observed two descalers which have both roll and brush type. They were being operated on domestic rods, low carbon, five gage, and foreign rods, low carbon, five gage, up to fairly bright basic wire. These machines were taking these rods, whether they were rusty, whether heavy scale or light scale or anything, and the manufacturer stated that his die life was sufficiently economical for him; he had previously used cleaned rods purchased as limed, and he was very well satisfied with the results he obtained and the difference in die wear wasn't appreciable. I saw some rusty rods going through there and it definitely showed that the rust was being removed, at least very substantially, and even the rust that was left on the rod did not affect the die life appreciably.

MODERATOR BALDRIDGE: That is what we have always maintained on this whole business. There is no one person or one mill or one group even that is going to work this out. I think everyone can contribute something to it. It may be several years, but I think eventually with exchange of ideas like here this morning, we can come up with a composite picture and really do something. Because, for instance, if something will work out in our mill, it is no proof that it is going to work in Keystone or Continental, because they have a different scale condition. So it is an individual mill problem, there is no getting around that; there are a lot of tricks and we just don't have any idea what they are yet.

A Member: What size roll appears to be best for No. 5 rod?

MODERATOR BALDRIDGE: That gets back to what type of scale you have. With us, a No. 5 rod, a four inch roll would be about the largest roll we can use, so we use a three. Of course with your bigger rods you can use a bigger roll. I understand there is someone here using about an eight inch roll. Doug?

MR. HARVEY: No, about a five inch.

MODERATOR BALDRIDGE: You find differences. I think every mill has to work it out for themselves, because again it depends on the type of scale; the more adherent the scale the smaller the roll.

A Member: I think the machine Bud is referring to there is the French "Gorcy", and they have a rotating system as well, which would appear to get to all planes, so that instead of having two plane attack, as you would in the set of rolls on the diagram, they have an over-all attack. But I can imagine with low carbon sometimes you can run into difficulty even then. And wear must be substantial.

MODERATOR BALDRIDGE: That is very true.

QUESTION on lubricants (inaudible).

MR. HARVEY: The lubricant we have used has just been 93, that has been the most successful, a standard of 93. It depends on your nail cutting success, with cutter life and die life. When we ran the descaler with rusty rods we picked up much heavier lubrication than we did with blank rod. I might mention if you have too heavy a draft on your first die you will have a lot of trouble drawing due to the extra drag you have with your descale rolls; if you have, say a 30 per cent draft on your first hole you will likely experience some breakage there; the die just won't pull it on the first draft.

A Member: Doesn't that indicate there is more wear or pull or pressure on your ripper die?

MODERATOR BALDRIDGE: It probably does. Of course, if you have this rod rolled around several rolls, you are just putting a mechanical pull on it anyway. That is why I feel every mill should work with the largest roll they can, because you are pulling back pretty hard on that, yet it doesn't change the physicals.

A Member: When you get back to the theory, you would normally think there would be more die wear. If there is, then what we save in acid we are at least partially spending for dies, aren't we?

MODERATOR BALDRIDGE: It doesn't seem to be turning out that way. No, we were willing to sacrifice dies, we had no choice and we were willing to sacrifice them. And, by gosh, we are not doing it!

A Member: Do you think, Bill, the ultimate would be the complete elimination of acid cleaning?

MODERATOR BALDRIDGE: No, there are all kinds of specialties.

A Member: What about the amount of water that the rod mill puts on the rod?

MODERATOR BALDRIDGE: That again has something to do with it. And the finishing temperature from your rod mill has a lot to do with it.

MR. HARVEY: Do you find a heavier scale breaks easier than the light?

MODERATOR BALDRIDGE: We find it breaks pretty easily. I was talking to someone yesterday who has a light fluffy scale and say they don't have much luck at all. There are going to be cases just like that.

A Member: Actually the die pressure on the first hole is less than the acid cleaned rod. Maybe that is why the first die stands up pretty well. And there isn't too much difference on die pull between an acid cleaned and descaled if you run the descaled rod through the lime. But you can't tell much difference on die life.

A Member: There is certainly one advantage, as I see it, to this descaling operation. That is certainly that you are going to be able to get your rod straight into the die, you are not going to have this angulation in going into the die.

MODERATOR BALDRIDGE: That is right.

A Member: Is that an advantage?

A Member: It certainly should be an advantage, in uniform wear around the die.

A Member: If the use of scale breaker precludes the use of acid, what luck do you anticipate on black annealed wire that has a skin on it between the bright anneal and the black anneal? How do you break it?

MODERATOR BALDRIDGE: You just run it through a small descaler, right behind the finisher machine, and it breaks off. Of course we have not run any pot annealed wire on that, but we have run quite a lot of patented low carbon wire.

A Member: I gather from your remarks that low carbon is apt to be more troublesome than high carbon?

MODERATOR BALDRIDGE: I think we are going to find that out later on. Right now we can't say that. Most of the work has been on low carbon.

A Member: Did I understand you put a stretch on your wire between your first set of three rolls and the second set of three rolls?

MODERATOR BALDRIDGE: No, I don't think you stretch the wire.

A Member: Would it help if you stretch in advance of your bending rolls?

(*Please turn to page* 709)

DRAWING of ALUMINUM WIRE

by J. S. Urbanik
Plant Superintendent
Kaiser Aluminum & Chemical Corporation
Newark, Ohio

This paper was presented before the Pittsburgh Regional Meeting of the Wire Association on May 9, 1952. In it the author briefly traces the history of metal working from the earliest records down to the present, devoting the main body of his paper to aluminum wire and going into equipment used, lubricating, dies and subsequent operations required to produce electric conductors.

The art of metal working has been traced by archeologists to about 6000 B.C., and the first metal used by man was Copper; it was not until about 4000 B.C. that the Egyptians showed knowledge of Iron, and about 1400 B.C. that the Greeks refer to the use of Iron. The transition period from the Stone Age to the Metal Age is referred to as the "Chalcolithic*1 period". During this period of some 2500 years, Copper was used in its natural state, until man developed the technique of alloying Copper.

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The early history of man is thus designated as developing in two stages—the Stone Age and the Metal Age. The Metal Age presents several phases—the Copper Age, the Bronze Age, the Iron Age and currently the Light Metals Age.

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The working of Copper deposits has been traced back to 6000 B.C. in wide spread areas such as Egypt, Cyprus, Persia and Turkey.*2 The art of alloying Copper apparently originated in Babylonia about 3000 B.C., and this led to the development of the Bronze Age. Copper working and its metallurgy progressed in Europe, and Asia along virtually parallel lines.

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Wire was first produced by hammering, and one of the earliest examples found was in the ruins of Pompei of some lengths of Copper cable, comprising fifteen Copper alloy wires twisted together and used for some purpose, before the city's destruction in A.D. 79.*3

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The drawing of Copper and Brass wire by a die is first recorded in Nuremberg, Germany, in 1360, by Rudolph of Nuremberg.

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In the year 1566 there is recorded production in Bristol, England of Copper wire drawing by drawing machines, operated by water power, and introduced from Germany, undoubtedly developments of the water power operated machines developed by Rudolph of Nuremberg. Up to that time wire drawing in England was effected by "girdlemen"—described as—"men sitting harnessed in certain swings, taking hold of the copper or brass thongs (i.e. strips of metal) fitted to the hole (i.e.—holes of the drawplate unit), with pincers fastened to a girdle, which went about them and then with stretching forth their feet against a stump, they shot their bodies from it, closing with the plate again".*1

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In the 19th century there were highly developed concentrations of Copper working industries in New England, and all the European countries.

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Into this field, there came in the latter part of the century a new metal—Aluminum. Aluminum was first isolated by Hans Oerstad, a Danish chemist in 1825; commercial production commenced in this country, by the Hall-Heroult process, in 1888.

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This newcomer into the non-ferrous field, has grown from a production of 5,010,000# in 1900, to our current production level of approximately 1,600,000,000# for 1951.

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Today Aluminum production volume exceeds Copper. Today we are at the true threshold of a Light Metal Age. The truth and significance of this statement may be observed from the U. S. Geological Survey of the relative volumes of metals in the Earth's crust.*2

Aluminum	**100**
Iron	**54**
Magnesium	**24**
Titanium	**7**
Copper	**0.12**

The development of the Electrical Industry stems from the turn of the Century, and no other single industry presents such a demand for wire for use as conductors.

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The first authentic use of Aluminum wire in this country was as electrical conductors, and today Aluminum as a conductor is receiving general acceptance as an alternative to Copper. Although Aluminum is fast replacing Copper as an electrical conductor, and

***1—From the Greek "CHALCO" meaning Copper.**

***2—Garland "Copper and Its Alloys in Early Times" from "Journal of the Institute of Metals" (1912).**

***3—Early references to wire are: (a) In the Old Testament—1055 B.C.: Chronicles XXII—3, "David prepared iron in abundance for the Nails, for the door - - -." (b) 850 B.C., Homer describes making a net of wire to catch Aphrodite, by Vulcan—in the "Odyssey" VIII, paragraph 273.**

***1—Letter by T. Evelyn, Commissioner of the Privy Seal, dated Feb. 8, 1676, in "The Natural History & Antiquities of the County of Surrey" V.I. London 1719.**

many of the larger manufacturers of Copper for electrical purposes are converting to the use of Aluminum, they, as well as those that are contemplating conversion, are still seeking information relative to the processing of Aluminum. This, in spite of the many symposia already written on the subject, in this country and abroad. More astonishing, however, is the fact that where a "standard" procedure is sought for in the fabrication of Aluminum no such specific "standards" exist as for the processing of other metals, particularly Copper.

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At best, this paper is a resume of the many, and more elaborated, treatises already published on Aluminum wire drawing, dies, dip solutions and equipment used.

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The drawing procedure of "E.C." grade Aluminum alloy wire for electrical conductors as practiced at the Newark Works of the Kaiser Aluminum and Chemical Corporation is hereafter briefly described.

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At the Newark plant we roll "E.C." grade rods to meet the requirements of the ASTM Spec. B. 230. The rods are hot rolled and bright finished, and ready for final processing.

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The standard "put-up" is in the form of 0.375″ diameter rod; coiled, with an eye of approximately 34″ and an O.D. of 46″. For wire diameters up to 0.1878″, "E.C." H-12 type ⅜″ rod is employed, whereas for diameters 0.1878″ and larger "E.C."-H16 type ⅜″ rod is used because of the higher tensile strength requirements. However, this processing procedure may vary according to types of equipment used and processing techniques. Since "E.C." Aluminum, with a purity of 99.45% minimum Aluminum, work hardens about 140 psi per 1% reduction in area, the following table indicates the recommended rod temper that may be employed to achieve the desired ASTM tensile values in the finished wire. This is merely for guidance.

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At present, Kaiser Aluminum produces a 230 pound average coil in "E.C."-H12, EC-O, ⅜″ rod, and a 205 pound average coil in the "E.C." H-16 grade. The ⅜″ rod is taken directly to the wire drawing machines after the rolling operation. No precleaning, pickling, or descaling of the rod is required. Weldability of rod of standard designs, with electric butt welders is ideal.

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Wire drawing equipment used ranges from one to five-block bull benches; 8 to 10-die machines of the enclosed horizontal tandem type, and 13 to 16-die circular tandem type machines. Drawing speeds range from 500 to 5500 feet per minute, being a function of the final diameter. A typical 10-die lineup, using ⅜″ "E.C."-H12 rod, for drawing down to 0.0772″ is as follows:

0.375″—0.316″—0.257″—0.217″
0.184″—0.157″—0.134″—0.114″
0.099″—0.086″—0.0772″

This represents a 96% reduction of area, and is accomplished without annealing.

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As all manufacturing men recognize, it is one thing to hope to obtain a certain physical value, but in turn take every possible advantage of specification tolerances. So that, if you expect a minimum of "E.C."-H16 values, do not count on getting the **maximum** of the "E.C."-H12 tensile range.

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The lubricant used for coarse and intermediate wire drawing is a petroleum base oil, with a viscosity of 2500 S.S.U. at 100° F. and is circulated through the machines at 150 gallons per minute. The average temperature of the oil as it is introduced to the machines is 110° F. On the fine wire machines, low viscosity, petroleum base oil, with a viscosity of 100 S.S.U. at 100° F. is employed.

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Type	Rod Tensile lbs. Minimum	Maximum	Finished Wire Diameter
E.C.-O	9,000	14,000	0.0769" - 0.0500"
E.C.-H12	12,000	17,000	0.1349" - 0.0770"
E.C.-H16	16,000	24,000	0.1350" and larger

Tungsten Carbide dies are employed in drawing Wire down to 0.050 inches diameter; Diamond dies are used from that point down through the finer gage sizes. The bearing lands of the dies are 20% to 50% of die hole diameter, and die approach angles are approximately 24° for wire diameters 0.257″ and larger; with approximately 16° angles for wire diameters less than 0.257″.

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Dies, and dip solutions, are most controversial subjects, but with the foregoing practice conditions, we have drawn in excess of 500,000 pounds of .1236″ diameter wire without experiencing any appreciable gallding of the Tungsten Carbide dies.

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European practice favors the use of emulsions over oils, this essentially because of the very high specific heat of water in comparison with oil. The commercial drawing speeds in this country are greatly in excess of European practices. This gives an idea of the good workability of "E.C." Aluminum rod.

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For operations subsequent to the wire drawing such as stranding in concentric, bunch or rope lay-ups, and in insulating, there is no special practice or precaution necessary with Aluminum wire, to allow for operational pull-down. Gauge tolerances are maintained with Aluminum as readily as with Steel and Copper.

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We are presently producing insulated conductors with Polyvinyl Chloride, Polyethylene, Rubber, and Neoprene compounds on machines designed for conventional Copper conductors. Aluminum wire presents another advantage in the operation with vulcanized insulations in that the metal does not react with the Rubber or Neoprene compounds and thus obviates the tinning operation or the use of a separator, essential with Copper.

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The writer having made transitions from Steel to Copper to Aluminum can truthfully say that the rolling, drawing, and further fabrication of "E.C." aluminum wire of-

***2—U. S. Geological Survey of 1924, to a depth of 50,000 feet.**

(*Please turn to page* 711)

FERROUS WIRE MEN . . .

Be sure to attend the Annual Convention of THE WIRE ASSOCIATION in Cleveland in November. Headquarters will be at the Carter Hotel and the dates are November 10-13, 1952.

A program of technical papers and other WIRE ASSOCIATION activities has been arranged for you that will command your interest and makes highly desirable your personal attendance.

YOUR PROGRAM WILL INCLUDE PAPERS ON:

The manufacture of copper-steel wire by electrolytic process.

A methods improvement study.

Lime for wire drawing.

Significance of elongation tests on cold drawn wire.

Magnetic and electrical properties of stainless wire.

The drawing of weaving wire.

Quality control in a fine wire mill.

Wire for pre-stressed concrete.

Salt versus atmospheric annealing.

Design of a galvanizing furnace.

ASCR wire.

Besides the papers, each of which will be followed by a discussion period, there will be the Annual Luncheon at which Peter Igoe will deliver the honorary Mordica Memorial Lecture, the Stag Smoker-Dinner, the annual business meeting of the members of THE WIRE ASSOCIATION and an interesting plant visit.

Full details will be published later, BUT, make arrangements with your company management to attend.

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 MAIN STREET **STAMFORD, CONN.**

(See page 682 for the Non-Ferrous Program)

HISTORY AND DEVELOPMENT OF PLANETARY THREAD ROLLING

by Howard D. Prutton
D. H. Prutton Machinery Company
Cleveland, Ohio

Delivered at the Pittsburgh Regional Meeting of the Wire Association on May 9th, 1952, this paper described the late developments that have made high speed thread rolling production practicable through the utilization of the planetary principle.

Planetary thread rolling is a method, by the cold forging process, of producing threads or other forms on a round blank with a continuous motion in a path around a rotary die. The name planetary has been applied to other applications, planetary gearing, planetary thread milling, roller bearings, etc. These applications have a marked similarity to planetary thread rolling and corroborate its practicability, as they have been accepted for years as the backbone of the metal industry.

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Actually, planetary thread rolling is not new; but today is practical through the efforts of the **D. H. Prutton Machinery Company.** In a letters patent dated July 9, 1867, issued to **Edward Croft** of Waterbury, Conn., he claimed the rotary similar to that used in our machine today. His idea, and it was just an idea, was far too advanced for that time. To make this system work satisfactorily and consistently all deflection in the machine must be eliminated. Under the terrific loads involved in thread rolling the steels and bearings were not adequate in those days to accomplish this; it was 1900 before the use of the roller bearing came into common use, nearly 33 years after the planetary thread roller was invented. I am sure that without this type bearing, planetary thread rolling would not be practical today either.

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In a later patent dated June 17. 1873, another form of rotary thread rolling was described. It contained two stationary dies with an oscillating motion applied to the rotary die. A blank would be rolled in each direction of the reciprocating movement without too much lost time.

The reason for the oscillatory motion was described in the patent as follows: **"The advantage gained by using crank movements for this class machine are, that by this means power can be used direct from a cylinder of an engine or main shaft without interposing cogs or belts, which are objectionable in machines doing heavy work". This statement explains why the reciprocating motion was first applied. However, in this day of rapid advancements, when bearings, gears, motors and other component parts are perfected as they are, it cannot be explained why this antiquated method is still retained. The only factor for retaining this method is the ease of making the dies required. Anyone with a plain milling machine and the proper cutters can make perfect reciprocating thread roll dies. This is not the case in the planetary method, for until recently in terms of standard available equipment it was impossible to produce accurate dies. To meet this problem a special thread milling machine was developed by our engineers to produce accurate dies on a production basis.

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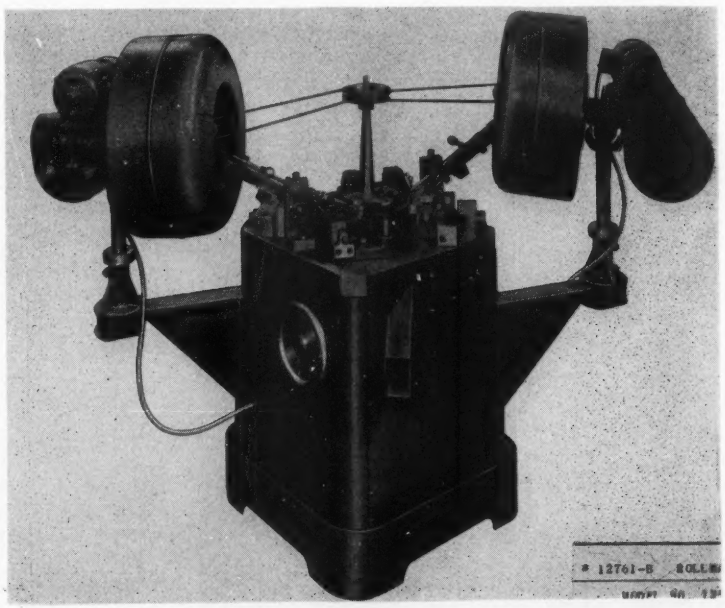
To produce a planetary thread rolling machine acceptable to the men of production involved four different fields of endeavor:

1.) **Hopper Feeding in a suitable quantity to meet the production requirements of the machine.**
2.) **Building the machine with rigidity and quality to withstand many years of continual operation.**
3.) **Produce accurate dies with the longest life possible.**
4.) **Produce the above three items on a production basis to keep the price competitive.**



Overall View of the Model No. 125 Rollmaster.

At the outset of our experimental work it was decided that a solid threaded die ring be used, with two stationary dies diametrically opposed.

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Theoretically, it is possible to feed a blank at every pitch circumference on the rotary die. This meant that for every revolution it was required to feed 55 blanks on each side. Since our spindle turns at 52 RPM a total of 171,600 blanks an hour were required, with a total production of 343,200 threaded parts per hour. This may seem astronomical to you, however it is possible, with adequate hopper feeding.

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After discussing this with local bolt makers and further experimentation we abandoned the continuously threaded die ring, the reasons being:

1.) **The undesirability to have a very high production capacity tied up in one machine.**
2.) **The extreme cost of producing the die ring. To produce a satisfactory die with an accurate thread form and lead, and to minimize the drunken thread produced by distortion in heat treatment, it was necessary to form grind the rotary die, which proved very costly.**
3.) **The short die life experienced on the ground form.**
4.) **Dies connot be reconditioned.**
5.) **Loss of production when chip-out or damage to a section of the die occurred. When this occurred in a very limited section, approximately ¼ of the production was lost. This does not include the time to change the cam so the machine would not feed during this cycle.**

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From users of this type of equipment it was determined a production speed of approximately 25,000 pieces per hour would be a happy medium, giving approximately four times the production capacity of the reciprocating types. Along with this the inserted dies in a rotary die holder was adopted. The advantages of making the rotary dies in four segments are:

1.) **Individual pieces can be replaced in case of damage.**
2.) **Thread Form can be milled accurately.**
3.) **Distortion from heat treat minimized.**
4.) **Grain positioning of die steel in each piece identical.**
5.) **Longer Die life.**
6.) **Dies can be reconditioned.**

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At this production speed each hopper feed should deliver 12,500 pieces per hour and be as universal as possible. To accomplish this it was necessary to design our own hopper. The hopper as it stands today will feed well over the required number of pieces per hour. It will handle all the standard headed products now rolled and many that were previously hand fed. Along with this, the feed rails are conveniently located so that specials can be adapted without altering the physical layout of the machine. They are also suspended properly to take full advantage of vibration aids to good feeding.

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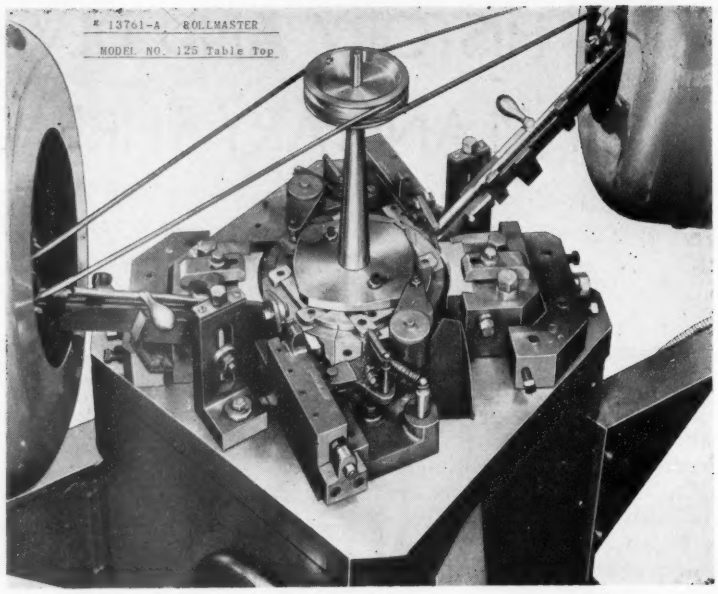
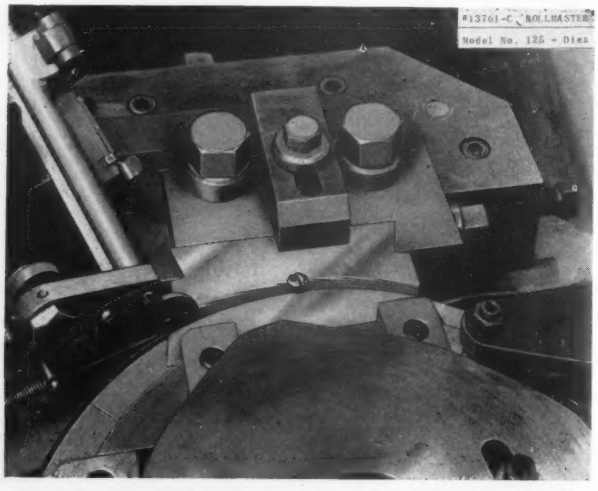
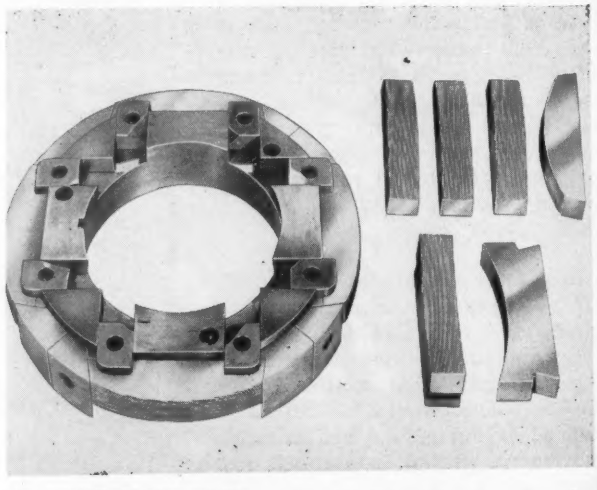
In any production machine the desirable feature is the ability to produce a product with consistent quality at a reasonable rate of speed. To accomplish consistency of quality, all operating parts are mounted to a common bed which is a piece



Close-up of the Table—Top Showing Mechanism. * * * * * * * *



View of the Thread-Rolling Dies. * * * * * * * *



View of Die Holder and Dies. * * * * * * * *

of high carbon steel plate 2-3/8" thick. The spindle is a forging weighing over 200# on the 1/4" machine and over 500# on the 1/2" model. The bearings are Timken Taper roller bearings loaded to 1/8 their rated capacity, traveling at 1/2 the rated speed. The bearing spacing is approximately 12" while the overhung load on the spindle from rolling is only 2-1/2". The stationary die holders are extra heavy with back up blocks pinned directly to the bed with the usual adjusting screws. The feed slides that introduce the blanks between the dies are well built and are individual in that, if a jam occurs in one the other will continue to operate. The cam that actuates the feed slides is mounted directly on the spindle. With this arrangement all deflections are eliminated and the quality of the final product is consistent for long periods without continual adjustments.

★ ★ ★

Licking the problem of manufacturing dies, to perform at a reasonable cost, is the real reason the Prutton machine is being accepted today. The many years of experimentation in die steels, methods of cutting, heat treatment and inspection, have resulted in dies that will produce four to seven times the number of pieces experienced on the reciprocating type. The factors that we feel influenced this are:

1.) **Die Design.**
2.) **Gradual even penetration.**
3.) **Constant Die Speed.**
4.) **Blank introduced at die speed.**
5.) **The steel used.**
6.) **Grain positioning of die steel considered in manufacture.**
7.) **Control of heat treatment.**
8.) **Accurate checking fixtures to control lead.**

★ ★ ★

The die design is an important factor and has a great deal to do with the gradual penetration. The curvature of the stationary die must be such to allow an even gradual penetration while forming the thread with a relief during the last turn of the blank; this relief is provided for burnishing the form. An important factor in die life is slippage between the blank and the dies; to alleviate this condition as much as possible our machine accelerates the blank to die speed before introduction. At introduction penetration is approximately .010", in a proper set up, eliminating any shock in starting. The die speed during rolling is constant and does not encourage slippage. To compare this with a reciprocating machine, the blank is introduced at a lower speed, but is accelerated during the first half of the die to a much higher speed and then decelerated before ejection. We feel this encourages slippage and die life is lost.

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The steel used in our dies is a low carbon high chrome, furnished by **Darwin & Milnar,** which we feel is the best available for our purposes. In making these dies in the four segments, each segment's grain positioning is identical with the others and produces an even wear over the entire four. In the case of the continuous ring die we found certain sections wore faster than others, from this we determined the grain positioning to give the longest life. The heat treatment of these dies is one of the most critical operations and the closest control possible is maintained. This is to insure proper hardness for different materials to be rolled and to minimize distortion. Along with this we have developed a fixture to check the lead on the dies and also any warpage. If the distortion or lead is cut off within the tolerances allowed, we correct by surface grinding. If the distortion or lead error is too great the dies are scrapped.

At the present we can roll:

1.) **All standard thread forms**
2.) **Spiral and ring shank nails.**
3.) **Knurling operations.**
4.) **Roll forming operations.**
5.) **Many marking operations.**

★ ★ ★

To give an idea of the economies involved in the operation of this equipment:

1.) **Initial investment about 1/3 to 1/2 that required for an equivalent production capacity.**
2.) **Savings in man hours approximately 65%.**
3.) **Savings in floor space approximately 65%.**
4.) **Die life four to seven times at a reported constant cost of 2½¢ per thousand.**
5.) **Overall cost 10.3 cents per thousand, as compared to 23½ cents on a late type reciprocating machine.**

Discussion on Mr. Prutton's Paper

MR. PRUTTON: Do you have any questions?

CHAIRMAN HILL: I have one Howard. Have you had any experience with Type A tapping screw?

MR. PRUTTON: We are rolling them in our plant but dies are not commercially avaliable.

CHAIRMAN HILL: Are dies available?

MR. PRUTTON: At the present time we are the only producer of the dies. We have approximately 200 dies of all sorts, shapes and sizes on hand.

CHAIRMAN HILL: About how long does it take for a changeover, of length and diameter?

MR. PRUTTON: A complete change of the machine from one size to another takes approximately 35 to 40 minutes. A change from one length to another in the same thread characteristic is just a matter of running the hoppers out and reloading them.

A MEMBER: On the reconditioning of your dies, what method do you use?

MR. PRUTTON: I wish I had the pictures so I could show it to you. In the rotary die it is a perfect circle with these four segments inserted into a die holder. To recondition the die all we do is shim behind the die and then grind the form, just dress and form. That is done on a surface grinder that we have attached; fixtures that follow the contour.

A MEMBER: Is that crush roll grinding?

MR. PRUTTON: Yes.

A MEMBER: Mr. Prutton, could you draw a sketch on the board of your arrangement?

MR. PRUTTON: Yes, I would be glad to. (Drawing on blackboard). On the rotary die, it is very similar to these and we have these stationary dies here and on each side we have rotary dies, or rotary stationary dies, very similar to them.

Now as this spindle turns each time one of these segments passes each of the stationary dies, a blank is introduced. So for each revolution we get eight pieces of final product. Now the curvature of this stationary die is the important factor. The rotary die is a perfect circle but here we have .010 penetration there, right in there we are approximately down to size, and right there on the circumference we have about .005 relief, and on the finer pitches it goes down to about .001 or .0015. These slides are here and your rails are here. The cam is mounted right on the spindle and actuates the slides.

A MEMBER: For given diameters have you been able to reduce die length required, on thicker bodies, over the old roller thumb where you needed five or six diameters rolled before you get your full thread formed; are you able to reduce that?

MR. PRUTTON: Actually the machine is rated for a quarter inch. We handle a range of from No. 4 to 5/16 on this machine. Actually on the 5/16 we get five and a half turns through the dies. For example, say on 1/32 we get approximately 13. If you want to get a higher production, we supply you with a die holder for the spindle with six stations on the spindle, and that gives a production of approximately 38,000 an hour. But that is for your smaller diameters, where you don't need the number of turns. On the smaller diameters we can roll hollow work because they do have those greater number of turns in the dies.

CHAIRMAN HILL: Can you feed the six stations?

MR. PRUTTON: Yes.

CHAIRMAN HILL: Can you keep up with them?

MR. PRUTTON: Yes. Incidentally, on certain nails, to answer Mr. Hill's question, say on a ring shank nail where you don't have any lead on the thread and you want to put on, we put on a solid die and an eight load cam and feed 50,000 pieces an hour through the machine.

** **Patent No. 139,861 Issued to Reinhold Boeklen, New York, N. Y.**

FOR NON-FERROUS WIRE MEN...

AN EXCEPTIONALLY INTERESTING PROGRAM HAS BEEN ARRANGED FOR THE ANNUAL CONVENTION OF THE WIRE ASSOCIATION—NOVEMBER 10-13, 1952, AT CLEVELAND, OHIO, WITH HEADQUARTERS IN THE CARTER HOTEL.

We want you to make a special effort to attend this convention and your presence will help make it the success that all the efforts of your Program Committee deserves.

This program has been set up by and for non-ferrous men—whether in the bare wire or insulated wire end.

YOUR PROGRAM INCLUDES PAPERS ON SUCH SUBJECTS AS:

The manufacture of copper-steel wire by electrolytic process.

A methods improvement study.

The application of the finest glass fiber made to insulated wire.

All plastic non-metallic sheath cable design.

Extruder design principles applicable to insulating and covering operations.

Dry blending of vinyl resins for insulated wire.

Silicone rubber as a wire covering.

Weathering characteristics of PVC-type plastics.

Effect of impurities on machineability and annealing characteristics of free machining brass rod and wire.

Cost reduction through improved plant layout.

Control of wet wire drawing solutions.

Other features of the Convention will be the Annual Luncheon, followed by the Mordica Memorial Lecture, the annual business meeting of members of THE WIRE ASSOCIATION, the Stag Smoker-Dinner and a plant visit. You should be in Cleveland to attend each and every one of the sessions and functions.

Full details will be published later, BUT, make arrangements now with your management to attend.

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 MAIN STREET **STAMFORD, CONN.**

(See page 678 for the Ferrous Program)

THE HIGH PRICE IN PRINCIPLES OF PRICE CONTROL BY POLITICIANS

by L. S. Hamaker, Assistant General Sales Manager
Republic Steel Corporation
Cleveland, Ohio

In his stirring address before the Pittsburgh Regional Meeting of the Wire Association on May 8, 1952, Mr. Hamaker called attention to the dangers to which our democratic form of government is subjected by such procedures as the steel industry seizure. It is part of a creeping encroachment on people's rights, of which they often are not aware until too late. However, he points out that corrective steps taken now, may result in some good as a result of this over-reaching of a power-greedy government.

If there were such a thing as a "handicap" allowance for speakers like there is for golfers, I believe, gentlemen, that I should be allowed a little extra as my speaker's handicap here tonight. After all, the subject I plan to talk about is probably one of the most intently and extensively talked about subjects in recent years. And not just by businessmen either.

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I suspect that a survey would show that the great majority of Americans in all walks of life—workers, farmers, housewives, students, educators, ministers, or just people in the great abstract—have talked and thought more about the events and issues of the seizure of the steel industry by the **President** than about any comparably serious subject in a long, long time. **Judge Pine's** historic decision now insures that the people even of future generations will know and talk about these vital events in the unfolding history of our democratic republic.

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In my opinion that is exactly as it should be. Not just the steel companies, but every citizen of this country is affected by this event. So will be the lives of all future American citizens. We are in the midst of a truly "Great Debate." I'm sure it will not subside until the issue is fully resolved, by the Supreme Court itself. This too is as it should be, since the issue is the fundamental question of whether the Constitution is still the supreme law of our country.

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I am not concerned, in the least therefore, about having to deal with a much-discussed subject here tonight. My chief concern and desire is that I might contribute in some small way to still further thought, discussion and even action on this challenge to a principle of our way of life which we thought to be secure at home even if in danger from abroad. Obviously it is not.

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Furthermore, our rights and freedoms never will be secure unless the people are ever ready to speak out whenever a fresh threat to them arises. On that score I can tell you that I am personally thrilled and reassured by the great and spontaneous outburst of rebuke and protest from all phases and peoples in this country over the president's high-handed seizure of the steel industry, and their consequent satisfaction with Judge Pine's decision. **Tom Paine** and **Patrick Henry** seem to have some numerous and vocal descendants still around.

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Indeed, history may show that some lasting good came of this drastic reminder from President Truman that the price of liberty is eternal vigilance. But it also occurs to me that there is an essential corollary to this old truism. People cannot be vigilant about something, especially about something as tangible as a right or freedom, **unless they understand it and recognize when it is in jeopardy.** Therefore, any discussion which can add to our understanding of what principles and practices of our inherited rights and freedoms are jeopardized by the seizure of the steel industry, is very much in order before any audience of citizens.

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And in addressing myself to so serious a matter, I am also mindful of **Mr. Justice Holmes'** admonition that "it is often more important to emphasize the obvious than to elucidate the obscure."

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Fortunately the issues at stake in the steel seizure are becoming more obvious to all as the obscurities of economics and politics are increasingly stripped away from them. And the very complexity of this whole matter is an important aspect of it.

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There is much significance in the very fact that what started out as a series of economic negotiations between private citizens has ended up as a cause celebre with vast overtones of political seizure of constitutional rights from all citizens. Here is why I point out this sequence of emphasis.

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I am no historian, but it is becoming obvious, even to laymen, that the favorite path of dictators to the usurpation of power lies along the complex economic arteries of a nation's life.

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People are not usually as aware of their economic rights as they are of their personal rights like freedom of speech and religion. So would-be dictators usually strike at a peoples' economic rights first.

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Even if ancient history didn't already show that clearly enough, then there is certainly no shortage of current horrible examples in the world. Maybe this stark example so close to home will awaken us to the full meaning of the socialist and communist pattern as it encroaches

from abroad.

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Think back on events of the past 20 years and you will see that always the entering wedge of the totalitarian approach to power is a quarrel over economics. The more complicated the economics, the better the smoke screen as the usurpers creep up on non-economic rights of the people.

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Now, in order to follow the well-marked pattern let's start with the economics or the arithmetic of the steel case and then go on to see how these became excuses for political and finally constitutional abuses.

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You will recall that this all began as a matter of wage negotiations between private citizens—between the steel companies representing 700,000 stockholders and the United Steel Workers representing 674,000 employees. Both groups were private parties, and presumably equal masters of their own rights as Americans. As I remember, we even dared hope that we could renew our contracts in a relatively harmonious fashion because it looked last fall like we were about to bring inflation under control. It seemed that the much-desired condition of stabilization was about to be achieved.

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And because we took at face value the Government's avowed desire to stabilize the economy, the Industry proposed a no wage increase-no price increase solution to the contract renewal. It did this in full knowledge of the arithmetic of the situation; namely, that while profits had declined in 1951 as compared to 1950, steelworkers' wages had kept ahead of increases in the cost of living.

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But, as this audience knows, proposals to settle the economic question of steel wages on the facts of arithmetic and the national policy of stabilizing the inflationary pressures of our defense efforts got nowhere—except to land the dispute in the hands of the Government.

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Now in theory, the Government entered the case as a neutral. The constitutional position of Government is to act in the best interests of **all** of the people and to maintain national economic stability. To help achieve this objective, the Government had expressly created the Wage Stabilization Board. And it should be remembered that this "tripartite" Board, composed of labor, industry and so-called public members, was set up as an "advisory" entity without power to arbitrate wage disputes and with powers only to "recommend" solutions to the economic issues brought before it.

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It is well worth noting some of the objectives cited by Congress in the Defense Production Act of 1950 which was the basic law passed to achieve—among other things—national economic stabilization. Let me read some of these objectives:

"It is the intent of Congress to provide authority necessary to achieve the following purposes in order to promote the national defense: To prevent inflation and preserve the value of the national currency; to assure that defense appropriations are not dissipated by excessive costs and prices; to stabilize the cost of living for workers and other consumers and the costs of production for farmers and businessmen; to eliminate and prevent profiteering, hoarding, manipulation, speculation, and other disruptive practices resulting from abnormal market conditions or scarcities; to protect consumers, wage earners, investors, and persons with relatively fixed or limited incomes from undue impairment of their living standards; to prevent economic disturbances, labor disputes, interferences with the effective mobilization of national resources, and impairment of national unity and morale . . . . etc."

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In light of what happened, after a special panel of the Wage Stabilization Board, which was established as part of this program, had spent six weeks listening to some 2,000,000 words of argument about the economic issues of the steel industry wage dispute, these noble objectives I have just read to you sound pretty hollow and ironic.

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I think it is a fair and meaningful question to ask how this hollow irony came about. In short, how did we get from an economic question of a steel wage contract that would be consistent with a stable economy to a far more urgent crisis over the constitutional rights of private property as guaranteed by the Constitution and our Bill of Rights?

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Part of the answer is that we did it by what might be called the "emergency technique." And I don't consider it irrelevant to observe that we seem to have been governed by this emergency-then-crisis-and-back-to-emergency technique for so long that it has apparently replaced what we used to call "normalcy."

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Only this time, as I said a moment ago, we thought we had almost mastered the emergency dangers of both inflation and a steel shortage that were set off by the Korean situation. Things were looking up—economically that is.

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But things are not looking up so brightly on the New Deal political front. And again, I don't think it is irrelevant to observe that this whole steel seizure uproar seems to have grown out of a political emergency which had these characteristics.

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If there was an emergency threat of a steel strike, there was also present a clearly defined law for handling such an emergency. I refer of course to the Labor-Management Relations Act, or Taft-Hartley Law, of 1947. Perhaps the most unhappy part about Judge Pine's decision, from the administration's point of view was that he so strongly emphasized the advisability of this law for use in lieu of the illegal seizure.

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This law was congressionally created, and has previously utilized provisions for temporarily preventing such a strike and also for fact finding procedures. But the Taft-Hartley is not politically popular, either with the Steel Unions or the President.

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It is easily understandable why they should not be fond of the Taft-Hartley Law and why it was not used here. In the first place it has mandatory power to delay a strike for 80 days, during which time the government can insist on collective bargaining. What is more, it provides for a secret vote among all the employees as to whether they will accept the last offer made by the company.

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When the Taft-Hartley Law was passed over Mr. Truman's veto, he solemnly declared, "It has become law . . . I shall see that this law is well and faithfully administered."

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Apparently Mr. Truman has for-

gotten about this good intention; in any case, the law was by-passed when the steel controversy was handed over to the Wage Stabilization Board.

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The WSB is only an advisory body, but its majority membership is notably sympathetic to the Union point of view on its past record; and what is more, it is not limited to fact-finding; it can recommend.

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And recommend it did—in such a way as to throw the whole weight of the Administration and the prestige of Government behind its recommendations. This audience is as familiar as I with the WSB's now famous "package" solution in the impending steel strike.

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I submit that the "emergency" here was borne with the announcement of the economically-inflationary and politically-loaded recommendations of WSB, contrived as they were in the dead of night on March 20th and announced over the immediate repudiation of the Industry members of the Board. One industry panel member, **Mr. Bane,** has testified that these proposals were brought forth barely an hour before the vote was taken on the proposals submitted by **Chairman Feinsinger.**

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The emergency was deepened by the gratuitous adding of the Union Shop recommendation to what was supposed to be an issue of economic stabilization. And it is more than a footnote to history that even the economics of the package were so emergency-conducive to have brought about the resignation of Defense Mobilizer Wilson.

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Yet, even in the midst of this contrived emergency the steel industry was still willing to try to rescue the principle of collective bargaining, itself a casualty of the Wage Board's over-reaching of its congressionally-specified functions,

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Thus, through the paths of political emergencies we finally came to our most severe constitutional crisis and debate since the famous court-packing episode. I think it is safe to leave it to public opinion whether this crisis, like the emergencies which led up to it was not predominantly a political creature. But whatever its genesis the result is a clear-cut issue of constitutional guarantees of the rights of private property and the powers of the President to seize them.

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Since this is the heart of the matter, and since this issue goes far beyond the seizure of the steel industry, I believe you would be interested in some relevant legal history which led up to the present chapter which Judge Pine has started writing, but which only the Supreme Court can finish.

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Mr. Truman is not the first president to claim "inherent" and "implied" powers beyond those which the authors of the Constitution and Bill of Rights set forth for this office. Accordingly, we already have some opinions on the issue from no less authority than the Supreme Court.

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In a celebrated Civil War case decided in 1866 (Ex Parte Milligan, 4 Wall, 218-259) **Judge Davis,** an appointee of President Lincoln's, stated: "The Constitution of the United States is a law for rulers and people, equally in war and in peace, and covers with the shield of its protection all classes of men at all times, and under all circumstances. No doctrine, involving more pernicious consequences, was ever invented by the wit of man than that any of its provisions can be suspended during any of the great exigencies of government. Such a doctrine leads directly to anarchy or despotism, but the theory of necessity on which it is based is false. . . ."

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Several years later, in 1882, in a case involving private property siezed by the government—as a matter of fact the home of **General Robert E. Lee** which was seized under the same excuse used by President Truman, namely in his role as Commander-in-chief of the armed forces—the Supreme Court stated (United States vs. Lee, 106 US 196-251):

"These provisions for the security of the rights of the citizen stand in the Constitution in the same connection and upon the same ground, as they regard his liberty and his property. . . ."

"No man in this country is so high that he is above the law. No officer of the law at defiance, with impunity. All the officers of the Government from the highest to the lowest are creatures of the law and are bound to obey it."

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And because we are now right in the midst of the latest and greatest episode in this historic argument I think you will bear with me if I re-quote the passage that Judge Pine found so relevant in the statement of Ex-President and **Ex-Chief Justice Taft** in his book, "Our Chief Magistrate and His Powers," Published in 1916 (P. 139):

"The true view of the Executive Function is, as I conceive it, that the President can exercise no power which cannot be fairly and reasonably traced to some specific grant of power or justly implied and included within such express grant as proper and necessary to its exercise. Such specific grant must be either in the Federal Constitution or in an act of Congress passed in pursuance thereof.

"There is no undefined residuum of power which he can exercise because it seems to him to be in the public interest. . . . "The grants of Executive power are necessarily in general terms, in order not to embarrass the Executive within the field of action plainly marked for him, but his jurisdiction must be justified and vindicated by affirmative constitutional or statutory provision, or it does not exist."

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Judge Pine pretty well summarized his own clear-cut decision when he said of his quotation from Chief Justice Taft, "I stand on that as a correct statement of the law."

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And, until the Supreme Court also decides on Judge Pine's decision that is where the whole matter stands as far as the issue is concerned of whether we still have a Government by men or by law under our Constitution.

However, even the great debate over constitutionality may be only the projecting portion of the iceberg of vital issues which are wrapped up in this whole matter. You will recall that, at the outset I suggested that here we have only the latest example of a long sequence of examples of a dangerous pattern of creeping dictatorship. The pattern is the one, popular among those who would subvert freedom, of using the economic ignorance or confusion of a people as the quickest avenue toward depriving them of their whole bundle of freedoms, economic, personal, religious and contitutional. Let me conclude therefore with a sort of drama critic's review of the whole steel case as one in another of these familiar dramas of "Revolution by Economic Subterfuge."

(*Please turn to page* 712)

COATING METAL USED IN HOT-DIP GALVANIZING

by Wallace G. Imhoff, President
The Wallace G. Imhoff Company
North Highland, Calif.

Part IV
COATING QUALITIES RESULTING FROM DIFFERENT GALVANIZING BATH COMPOSITIONS.

This is the fourth and last of Mr. Imhoff's series of papers on galvanizing metals. Earlier installments appeared in April, May and June. Mr. Imhoff, a leading authority on galvanizing, has made a contribution to the literature on galvanizing in this series that is of outstanding importance.

Metals Not Normally Added To The Galvanizing Bath:

There are some metals that get into hot-dip galvanizing baths by accident, as for example in using remelt zinc, or when using zinc scrap. One of these metals is copper, and therefore it is pertinent to ask the questions, "What effect does copper have upon the corrosion of zinc coatings? Does it tend to increase the life, or accelerate the destruction of the protective coating?"

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The potential series of metals with regard to their susceptibility to corrosion by water, as determined by measuring their solution pressures, was reported by Weston to be as follows: "Aluminum, Zinc, Iron, Nickel, Lead, Tin, and Copper." Thus, alone, we find that copper is excellent in its corrosion resistence by water. There is therefore no reason to believe that additions of small amounts of copper to the galvanizing bath should do anything other than to increase or add to the corrosion resistance of the zinc rather than accelerate its destruction.

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It has been stated by one authority "If copper is present in zinc in a very small quantity it seems to have a protective effect." Another reference states, "The protective effect of a small amount of copper on the corrosion of zinc is reported by Prost, who states that a small quantity of copper seems to have a very protective effect." Rawdon says, "Antimony in amounts from 0.03 to 0.07 percent seems to have an accelerating effect on corrosion, whereas small amounts of copper, even a few hundreths of one percent, appear to exert a protective action." The writer after a number of years of research investigations, and from actual practical experience, has found the metal antimony, when present in small amounts in zinc, also has a very protective action against corrosion. However, antimony tends to make the zinc coating very brittle, and it therefore, cannot be used in coatings that will be bent. A formula for an alloy addition to metal ware galvanizing baths, which has been in use for over twenty years by a number of large metal ware galvanizing companies bears out this result, since the small antimony addition is made for two specific purposes which are:

(a) To keep the finish of the zinc coating brighter longer on the dealer's shelves (a simple aluminum addition will give a finish that corrodes much quicker than one in which a small antimony addition has been made), and—

(b) To improve the spangle and give a pearly lustre to the finish. It has been established definitely in practice therefore for over twenty years, that small antimony additions greatly improve the corrosion resistance of the zinc, and also improves the appearance of the spangle.

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F. N. Speller, in a paper read before the American Iron & Steel Institute, New York, October 22, 1926, states: "The impression that wrought iron is generally more durable than steel has not been sustained by comparative tests in service and seems to have originated from the greater durability in the air of wrought iron made from Eastern Ores, containing a few tenths of 1 percent copper."

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It has been firmly established long ago that small additions of copper greatly improve the corrosion resistance of the base metal. It is therefore not at all contrary to expect that very small additions of copper to zinc will also greatly improve the resistance of the galvanized coating against corrosion.

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The saturation point of zinc for iron at galvanizing bath temperatures is 0.1 to 0.13 percent before dross will settle out. The same principle holds with copper additions, namely, that a very small amount, possibly up to 0.15 of 1 percent will go into solution in the zinc, and then further copper additions to the bath cause over-saturation, which is indicated practically by a "red smear", or the formation of a copper oxide over the zinc coating finish, which of course ruins it. When other metals are present up to as high as 0.20 to 0.25 of 1 percent have been used without any damage to the finish. These other metals also help to hold the copper in the bath, rather than have it go out as the red oxide with the coating finish.

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There are many references definitely showing that a steel base metal carrying a small percentage of copper, is superior in corrosion resisting qualities to plain open hearth steel. However, it is really surprising on making a thorough search through the technical literature on corrosion, how much data and information are available on copper-bearing steels, and how little information and discussion and technical facts there are available

on copper in zinc coatings. Even today the information and data are so scarce that almost no definite conclusive statements can be made as to the service that small additions of copper in zinc coatings perform.

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The writer has followed copper additions in zinc baths as an impurity in slab zinc for many years, and never in one single case that has been studied, has the small percentage of copper caused any trouble of any kind. At one time when concentrating on this phase of impurities in slab zinc, the writer made some very conclusive tests by actually adding copper to galvanizing bath. It so happened an old building with a sheet copper roof had been torn down, and a number of pieces of this sheet copper were put into the galvanizing bath purposely to study the effects of copper in the molten zinc bath. The copper sheet was added in very small pieces, and weighed carefully when added. Up to about 0.30 of 1 percent there was absolutely no evidence of any copper being in the bath; it just dissolved in the zinc bath, and went into solution alloying with the zinc. Above this point, further additions of the sheet, copper developed a dark reddish oxide smear at various spots over the finish, and it was at once recognized that this point was the time to stop adding copper. A point of interest to note is that the appearance of patches of red copper oxide smear in the coating were quickly eliminated by adding a little aluminum and a little tin to the bath. This meant of course that where previously the bath was saturated with copper (from the galvanizing viewpoint) and the excess was going out as the red copper oxide, the addition of aluminum and tin took up the excess, and the clear zinc finish was again established.

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It is extremely important to find these observations verified in the metal used by another galvanizing company. This company was situated in the vicinity of a zinc smelter, and although the metal purchased was "Remelt" zinc, it was as a general thing high quality metal from the standpoint of iron content and melting practice. The metal was always clean, and examination of the slabs showed that it was seldom overheated. A typical analysis of one carload of this metal showed a lead content of .64%; a cadmium content of .17%; a tin content of .32% and a copper content of .08%. Another slab zinc analysis showed .05% iron; .34% lead; .013% Cadmium; and .46% copper. Still another example of this metal showed —.01% iron; .85% lead; a trace of Cadmium; .70% tin and .30% copper. Many other examples could be given, but nothing of importance would be added. Even with .46% copper content no trouble was ever encountered when the other impurities, tin, cadmium, and alumium were high enough to hold the copper in solution in the bath, and not permit it to come out as the red copper oxide smear. It is also of interest to note that this company was doing much government war work with this kind of metal carrying in some cases a very high copper content. No rejections were ever made on the basis of copper content in the slab zinc, or galvanizing bath, or zinc coating.

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Rawdon, in his book, "Protective Metallic Coatings", p. 68, in Table 3, gives the chemical composition of some commercial hot dipped zinc coatings on sheet iron and steel. This table is given below:

Fe	Sn	Pb	Cu	Sb & Al		Zn
3.7	0.10	0.80	0.09	—	—	95.31
3.5	0.70	0.72	0.06	—	—	95.02
3.2	0.22	0.71	0.05	—	—	95.82
2.7	0.08	0.82	0.02	—	—	96.38
3.1	0.73	0.81	0.02	—	—	95.34

In discussing this table it is interesting to note that Rawdon does not mention the copper content in the zinc coating.

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It is always well to bear in mind the practical aspects of zinc coatings, namely, that the first, and basic consideration for service is the actual thickness of the metal deposited. Some years ago the writer made some extensive investigations on the general effect of tin in the galvanizing bath. It was found when the coatings from a number of different companies were tested that one set of samples were very much lighter than any of the others, and that this company made heavy tin additions. At the time of the tests, corrosion resistance was not the special factor sought after, but just on general principles of thickness and weight of coating deposit, if corrosion had been the important factor wanted, it would be expected that the samples showing high tin content would be among the first to fail. The question would then come up—"Was the failure due to the tin in the coating, or due to the fact that because of the tin addition, the bath metal was much thinner, the run-off faster and better, and therefore the actual metal deposited as coating much less?" According to the first basic consideration of thickness and weight of metal deposit giving the best corrosion resistance, the basic answer would be, failure due to a lighter metal deposit. The second answer then would be that it was due to the tin addition to the galvanizing bath.

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Since no one has definitely answered the question of whether copper is beneficial in retarding corrosion of zinc coatings, it might be of interest to postulate a special zinc coating that would have corrosion resistance superior to the usual coating. For example, aluminum additions would be entirely eliminated in favor of using cadmium which has excellent qualities of corrosion resistance, and can be used to replace aluminum as a finish brightner. The cadmium could be obtained by using high cadmium slab zinc. Copper additions up to 0.20 with an extreme upper limit of 0.25% could be made for the same reasons these copper additions are made to steel. The lead content of the bath would vary between 0.75 and 1.25% with an average of 1.00%. Thus a special corrosion resistant zinc coating has been developed which should be far superior to the usual, or standard coating. Antimony has been added to zinc baths in small quantities to stop tarnish and dulling of the coating in warehouses, and in storage. But antimony makes zinc coatings very brittle; thus by using copper in small amounts the same results can be obtained without the brittleness. The metal cadmium is also

superior to aluminum, and thus a cadmium-copper-lead zinc coating should produce an excellent corrosion resistant zinc coating. This imaginary coating has been made up from many years of practical experience and observation, rather than from technical knowledge which at present does not seem to be available. A copper-bearing zinc coating should give a longer zinc coating life than a plain zinc coating, just the same as has already been proven that a copper-bearing steel gives a longer life than a plain steel base.

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In examining many records to see what the high limit of copper in galvanizing baths has been the writer was very much surprised to find this analysis of "Remelt" slab zinc in his files—

Cadmium	0.13%
Lead	2.28%
Copper	0.84%
Iron	0.09%
Tin	1.27%
Zinc	95.39%

There was no record or note of any kind stating that this metal was not satisfactory. No complaints were found anywhere in regard to the copper content; high aluminum and high iron usually were the causes of complaint. ★ ★ ★

The literature does not seem to reveal any technical information about the use of magnesium in hot dip galvanizing baths. It has been brought out that some impurities are usually found in slab zinc; other impurities, as an example, aluminum, may be added to the galvanizing bath; and finally still other impurities, such as copper and antimony, may get into the galvanizing bath due to the purchase of "Remelt" zinc, or by using zinc scrap that may contain these metals. There is the final class of impurities, such as magnesium, nickel, etc. that very little is known about their effects on zinc coatings even in small amounts. None of the standard text books on hot dip galvanizing, or books on Metallic Coatings, or even literature on corrosion, even mentions these last metals as evidently there is no technical information available on the subject, although no doubt there is some information packed away in the private files of companies hav- a research laboratory for finding out such results.

The writer has made some investigations and the results of these tests are of special interest. Some years ago under practical operating conditions, investigations were made to discover just what effect on the galvanizing bath, on fluxing conditions, on the coating appearance, etc., small additions of the metal magnesium would make as measured by the standard galvanizing practice used. A few bars of pure magnesium were purchased, and under careful test supervision small pieces of magnesium were added to the galvanizing bath during actual galvanizing operations. The very first thing noted was that magnesium, even in small amounts, changes the zinc coating finish to a satin white silver color. The spangles were very small, and finish was a white satin lustre.

★ ★ ★

When the magnesium addition was increased in amount, then it was not long until trouble started to develop with the flux. The operator noted that his flux was gradually drying up and taking on a consistency like Pop-Corn. Zinc Chloride melts at 689 degrees F., and magnesium chloride melts at 1307 degrees F. The normal fluxing reaction is to form zinc chloride which furnishes a good medium for continuing the fluxing operations. However, with even fairly small amounts of magnesium added to the bath the magnesium reaction appears to be very much stronger than the zinc attraction for the chloride in the flux, hence magnesium chloride is formed, and the bath appears much too cold for holding the salt in the fused state, so it turns to a Pop-Corn-like consistency which soon stops galvanizing operations. In the case of too heavy aluminum additions to the zinc bath, the aluminum forms aluminum chloride in preference to zinc chloride, and this goes off as a smoke or gas, eventually stopping galvanizing operations because no liquid flux can stay on the bath. It will be noted that zinc chloride melts below the melting point of zinc and hence it is a liquid, but magnesium chloride melts at a much higher melting point than that of zinc, so it slowly dries up the flux, and changes its consistency so that it no longer has any fluxing qualities, and hence stops operations.

The results of these actual preliminary tests revealed that it is not practical to make even small additions of the metal magnesium to the ordinary standard galvanizing bath. However, that does not eliminate this idea entirely, as there are many ways of coating other types of articles that could eliminate the old conventional types of fluxing methods, and employ a different technique to obtain the white finish if it is so desired for commercial uses.

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This concludes the knowledge of actual tests made with various metallic impurities. We thus have four general conditions which are —1. The standard metallic impurities generally found with zinc. These include iron, lead, and cadmium. 2. Metals deliberately added to the bath for one purpose or another from a commercial standpoint. These include aluminum, tin, and antimony. 3. Metals that find their way into slab zinc through such sources as scrap zinc, and "Remelt" zinc. These metals include copper, iron, tin, lead, and sometimes antimony. 4. Metals that have been experimentally, or otherwise tested for their effect on galvanizing baths. These metals include copper, magnesium, and nickel.

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Some very preliminary tests were made by the writer to see what effect small additions of the metal nickel have on the galvanizing bath, the flux, and on galvanizing operations. Nickel dissolves slowly in the molten zinc, and unlike iron articles, dross does not form on the nickel surface no matter how long the nickel is held in the bath; the nickel just keeps on dissolving in the molten zinc bath. However, on very close observation of the effect of nickel in the bath, it appears that perhaps due to the very much higher melting point of nickel than that of zinc, that first a thin skin starts to form over the surface of the galvanizing bath. With increasing amounts of nickel dissolved this skin thickens up and appears to freeze over the bath surface. At this point if additions are not stopped the entire surface of the bath will probably freeze over solid.

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The finish on the articles changes from the bluish color of the zinc over to the somewhat yellowish cast,

or whitish color of the metallic nickel. The spangles of the test were very small perhaps due to the very quick freezing of the coating on the articles. No special value could be attached to adding metallic nickel to the ordinary standard galvanizing bath, although perhaps some additional tests and experiments could reveal some facts not seen in this very limited preliminary test.

★ ★ ★

A number of years ago, before World War II, Dr. Franz Wolfson, Consulting Engineer, of Leipzig, suggested a number of different alloy compositions be tested, and experimented with by one of our largest American galvanizing companies. These alloy mixtures were designed to reduce brittleness, but no actual results of tests made with any of these alloys was given. The first alloy consisted of ZINC-ALUMINUM-BISMUTH. The alloys were of course to be used in small amounts during galvanizing operations. The second alloy was—ZINC-ALUMINUM-MAGNESIUM-TIN. The third alloy was—ZINC-ALUMINUM-TUNGSTEN-ANTIMONY-BISMUTH. The fourth alloy consisted of—ZINC-ALUMINUM-TIN-COPPER-MAGNESIUM. The fifth alloy was ZINC-ALUMINUM-TUNGSTEN-COPPER. In all cases the additions were to be made in much less than 1.00% of the capacity of the galvanizing bath. In the alloys containing TUNGSTEN it is stated that 0.5% or more of the alloy are used with 99.5% of the molten galvanizing bath. These various alloy mixtures were offered for experimental tests, and no specific information was given as to what would happen when they were used.

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This covers in a general way the entire situation as to metal and alloy additions to hot dip galvanizing baths, and what the effect is of various impurities in the coating metal on the coating itself, and how they affect galvanizing operations. A summary of the entire field covered is of value as a quick reference when this topic is under discussion.

SUMMARY

IRON: This impurity is especially harmful because it destroys large quantities of good bath metal turning it into the common by-product known as "dross". Galvanizing operations would quickly come to a standstill if the iron were not removed in the dross, and carried out in the zinc coating. Removal of dross, and the metal carried out as coating make room for fresh slab zinc metal additions which always keep the iron content down low enough so that normal operations can be carried on removing still more iron and permitting the addition of fresh zinc low in iron content.

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LEAD: The metal lead is extremely valuable as an impurity in hot dip galvanizing baths. It lubricates the zinc; it tends to make the coating soft and ductile; it gives fluidity to the bath; it is invaluable as a means of keeping down the dross formation; it materially aids galvanizing operations by settling to the bottom of the pot, and forming a cushion upon which the dross can settle. This makes drossing operations much easier than when the dross burns tightly to the pot bottom. Lead is especially valuable in destroying the combination of high iron content and high aluminum content which give a thick sluggish galvanizing bath, an extremely heavy coating metal, high metal per ton of product, and directly result in extremely high dross production. Lead in the proportion of 0.75 to 1.25%, with an average of 1.00% is very beneficial in galvanizing operations.

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CADMIUM: This impurity is found along with the zinc ores in some localities, and when the two ores are smelted, the cadmium comes down with the zinc. In small amounts the metal cadmium is very useful and beneficial. Cadmium can be used in place of aluminum as a brightener, and for spangled coatings it gives a beautiful frosted irridescent flower-spangle. Aluminum produces a blue oxide that is very undesirable on the galvanizing bath surface; cadmium produces a fine oxide powder. It gives the finish a whitish finish, and tends to produce a very smooth bright metallic lustre resembling chromium plate. It thins down the bath, and if kept in amounts from 0.05 to 0.25% it is a very desirable impurity in some galvanizing baths.

★ ★ ★

ALUMINUM: The normal metal addition made to galvanizing baths is aluminum. However the use of aluminum in galvanizing baths can be extremely harmful under certain conditions. For example, too much aluminum will ruin the flux and stop galvanizing operations completely. Even an excess of aluminum may make the flux very costly since very large quantities can be lost by the formation of aluminum chloride. Aluminum additions are also delicately affected by the bath temperature. At high bath temperatures large amounts of aluminum are lost as the blue oxide that goes out into the oxide skimmings on the bath surface. On the other hand if the bath temperature is quickly dropped for another kind of article, then the bath will have an excess of alumium content. If the bath is at a low temperature, and an article requires a high temperature, then the bath will appear to be short of aluminum. Different amounts of aluminum must also be used in different fields of galvanizing, and for different kinds of work. The combination of high aluminum and high iron with no lead is particularly objectionable in that this type of a bath is thick and sluggish; the metal per ton of product is excessive; the dross production is doubled in many cases, and operating conditions are extremely bad from all considerations. Too much aluminum may also give the finish a solid metal skin finish and no spangle. The adding of aluminum to a galvanizing bath is a very delicate operation, and contrary to general belief, much waste can result, and operating conditions can become extremely costly.

★ ★ ★

TIN: The metal tin has been added to galvanizing baths as general practice for a long time. Both tin and cadmium are used in sheet baths, but no aluminum. Tin gives the finish a bright large spangle, and sometimes takes the form of five-pointed star-like crystallization. It tends to thin out the bath and make the coating thinner and lighter, and on none-spangled finishes gives a solid bright metallic tin-like finish. It has been used up to 2.50 per cent in metalware baths to develop a beautiful spangle, and will vary in sheet baths from 1.00 to 1.25%. The figures cited for the tin in sheet galvanized coatings show a value in the coating up to 0.82%. Some tins carry the metal antimony, and therefore

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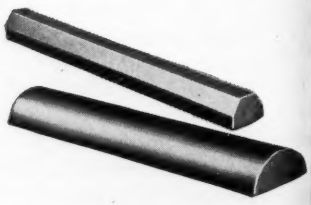

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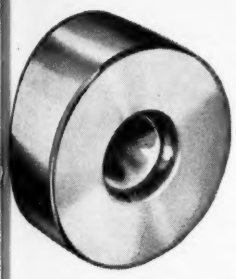

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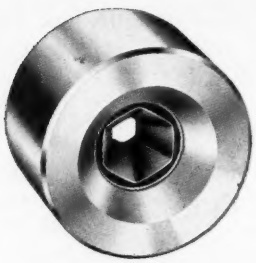

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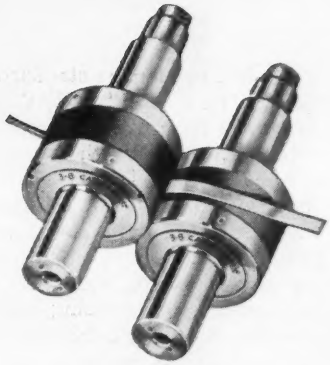

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Made of Carboloy Cemented Carbide, hardest metal made by man, they're designed with the stamina to stay on the job to the last full second of performance in every hole size. And every saving in downtime increases your bonus tonnage.

Extra services, too

The broad Carboloy service program helps you get out of Carboloy Wire Dies all the famous Carboloy performance.

Carboloy Die Service Centers, for example, and Carboloy Field Engineers are both ready with any help you need on die service problems. Behind them lie all the Carboloy *factory* carbide-die experts and facilities.

Large standard die stocks are yours for fast tapping in Detroit, Los Angeles, Chicago and Pittsburgh. You save hours, or days, on deliveries of vital dies, cut downtime to the bone.

The Carboloy tuition-free Customer Training School (Detroit) helps train your key men in 3- or 5-day concentrated courses. Gives them latest helps on carbide draw dies, maintenance methods, die-room operation. Helps get your carbide program on a money-saving, high-gear basis. Gives *you* more productive personnel, as well.

Finally, the free Carboloy Die Service Manual D-119 makes die-handling helps available to men in your plant. It's 64 pages, crammed with information.

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it has become almost standard practice to only use "STRAITS" tin, which is the pure commercial tin carrying very low other impurities. It has been stated by one galvanizer that very heavy tin additions actually increase the metal per ton of product and tend to make the coating brittle. Small quantities of tin thin out the galvanizing bath, and hence tend to give a thinner coating.

★ ★ ★

ANTIMONY: The metal antimony has been used in small amounts to develop a frosted finish on metal ware articles, and also for the purpose of stopping the tarnish of the finish on metal ware due to standing for some time on the dealer's shelves. A zinc coating finish tends to become dull and white from long standing, and a small amount of antimony tends to act as a corrosion resistant material to hold the bright finish on the fresh article. Antimony tends to make the zinc coating very brittle and hard, and will cause peeling and flaking when added in too large amounts.

COPPER: There appears to be no data at present to prove that small additions of copper in the galvanizing bath are not beneficial. Of course the amount is to be held to an upper limit of 0.25% copper; that amount keeps the copper all in solution in the bath, and no red scum, or copper oxide will form with this amount. Although galvanzing baths have been found with a very much higher copper content, in every case where the amount was higher, it was also found that there was tin, cadmium, and aluminum also present to combine with the copper, and hold it in solution in the bath. From a corrosion standpoint small amounts of copper under, and up to the limit stated, should be very beneficial. The literature on copper in zinc coatings is almost nil, so that it can be cited only from practical experience, and some actual tests, how the bath and coating are affected by small additions of copper. A cadmium-copper-lead-zinc galvanizing bath should offer enough possibilities for someone to conduct actual tests to determine the value of such a combination from the viewpoint of corrosion resistance, as compared to the normal hot dip galvanized coating.

★ ★ ★

NICKEL: Some extremely preliminary tests conducted with metallic nickel additions to the galvanizing bath, seem to indicate there is no special reason why nickel should be used. It appeared to freeze up the bath, and the coating had a tendency to crack and peel off readily.

★ ★ ★

MAGNESIUM: Magnesium tends to give a zinc coating a white satin-like finish. The spangles are very small, and there seems to be no special advantage to be obtained due to making such an addition. In view of the fact that it also ruins the flux, and interferes with normal galvanizing operations, it would appear that there are better reasons for not adding this metal to the galvanizing bath.

★ ★ ★

In considering all of these metal and alloy additions to the galvanizing bath, there is one final comment that might be of interest. When metals like tin, aluminum, and magnesium are added to the bath it appears that these metals come to the surface and cool last giving the bright finish. As a typical example, if enough tin is added, the spangle will close up entirely and there will be a solid covering of tin; the same is true of aluminum. When too much aluminum is added the hot water tank, or other article may show large areas of solid metallic finish with no spangle development at all.

★ ★ ★

This fact might be worth further investigation along the lines that an entire finish surface of tin, aluminum, or magnesium might be obtained with a high enough addition of these metals to the bath. It would of course require special operating techniques to conduct such coatings for the reasons mentioned, that is, destruction of the flux etc. However it might be a new method of obtaining such a finish on strip steel, or other baths where a special set of operating conditions could be developed to coat without using the conventional fluxing operation.

PLEASE NOTE THIS IMPORTANT CHANGE

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Executive Secretary

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Government Wire Production Information

Copper Wire Mill Products

The following are the changes effected in National Production Authority Order M-86—Distribution of Copper Wire Mill Products to Distributors—as amended May 28:

Section 3. **How a distributor obtains copper wire mill products.** (a) Commencing October 5, 1951, and subject to the quantity limitations of sections 4 and 7 of this order, a distributor may apply the Controlled Materials Plan allotment symbol X-6 to orders for copper wire mill products for the purpose of replacing his inventory of such products.

(b) A delivery order bearing the symbol X-6, together with the certification provided for in section 8 of this order, shall constitute an authorized controlled material order for the purpose of all CMP regulations.

(c) Commencing May 28, 1952, any distributor who during the preceding calendar month has delivered copper wire mill products from his inventory to fill authorized controlled material orders which bear program identifications consisting of the letter A, B, C, or E, followed by a digit, or the program identification containing the suffix B-5, in obtaining materials to replace in inventory the copper wire mill products covered by such orders may append as a suffix to the X-6 allotment the program identification B-5, so that the authorized controlled material order placed by him will contain a program identification which reads X-6-B-5.

(d) Subject to the limitations of any other applicable NPA order or regulation, a distributor may purchase copper wire mill products without limitation where such purchase is not a purchase from a domestic copper wire mill or another distributor which will result in a violation of section 4 or 7 of this order. A distributor may allow the allotment symbol X-6 to all such orders for copper wire mill products. Such orders are hereby designated authorized controlled material orders for the purpose of section 17 (d) of CMP Regulation No. 1.

Sec. 4. **Monthly X-6 quotas on orders placed with copper wire mills or other distributors.** (a) Commencing October 5, 1951, a distributor may place orders with copper wire mills or with other distributors for a quantity of copper wire mill products (measured in pounds of copper content) equal to the quantity by which 25% of his shipments of such products from his inventory during his base period exceeds the copper content of his inventory of copper wire mill products on September 30, 1951, to which orders the allotment symbol X-6 may be applied. All such orders placed pursuant to this paragraph shall call for delivery during the fourth calendar quarter of 1951 or any subsequent calendar quarter. A distributor shall convert

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REGISTERED

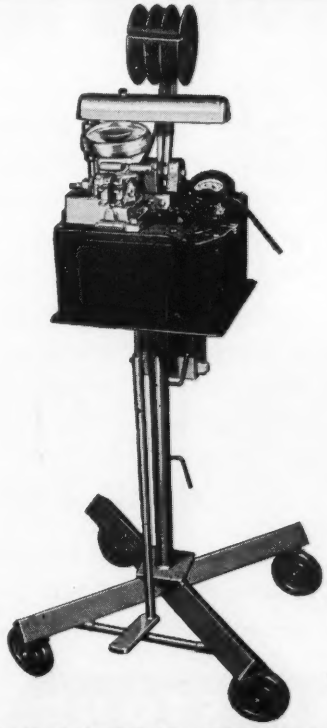
MODEL S.E.M.T. MICRO-WELD BUTT WELDER

This welder was designed and developed expressly for welding all types of fine wire: Aluminum, Copper, Brass, Bronze, Steel and Steel Alloys, ranging in size from .005" to .020" diameter.

Unit design of frame, transformer and power sub-assemblies permit other range of sizes to suit requirements.

Equipped with a temperature indicating annealing and tempering device, voltage regulator and meter to compensate for voltage fluctuation, wire cutters, extra large 5" diameter magnifying glass, fluorescent light and extension cord. Welder can be supplied for bench mounting, or mounted on 4-wheel truck.

The adaptability of this unit for welding all types of wire, either ferrous or non-ferrous, in sizes from .005" to .020" diameter, makes it ideal for the fine wire manufacturer.



MICRO PRODUCTS CO.,

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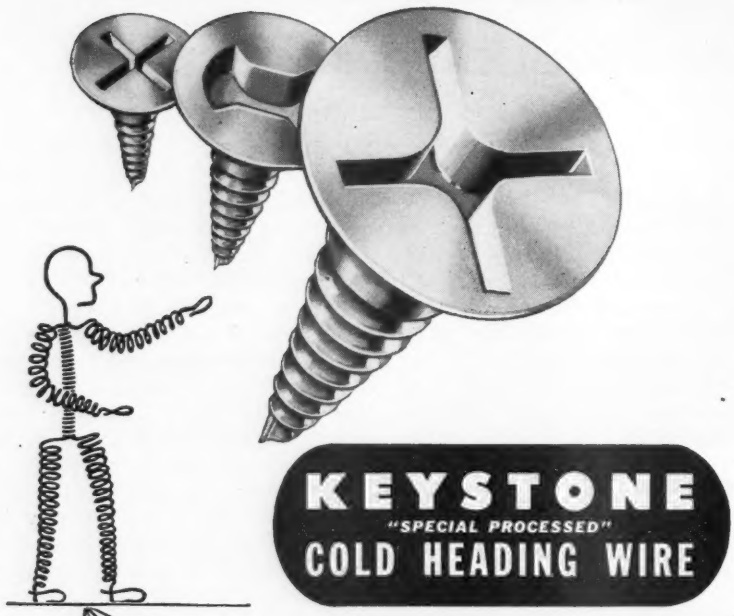
Telephone: STATE 2-7468



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all outstanding orders calling for delivery during the fourth calendar quarter of 1951 to authorized controlled material orders bearing the allotment symbol X-6 prior to October 15, 1951, and shall reduce or cancel all such outstanding orders which call for delivery of a quantity of material in excess of the quantity permitted by this paragraph. For the purpose of this paragraph all copper wire mill products received by a distributor after September 30, 1951, and shipped prior to October 15, 1951, shall be deemed to have been received pursuant to an order bearing the allotment symbol X-6.

(b) Commencing November 1, 1951 any distributor who, during the preceding calendar month has delivered copper wire mill products from his inventory to fill authorized controlled material orders placed with him, may place an order or orders with a copper wire mill or another distributor for a quantity of copper wire mill products equal to 100% of such deliveries (measured in pounds of copper content) to which orders the allotment symbol X-6 may be applied. All orders placed pursuant to this paragraph shall call for delivery after December 30, 1951.

(c) A distributor may not place duplicate orders bearing the symbol X-6 in anticipation of cancelling one upon delivery of the other.

Paragraph (d) under Section 6—**Limitations on acceptance of orders by distributors now reads as follows:**

(d) A distributor may not accept any order for copper controlled materials except an authorized controlled material order, or ship or deliver any copper controlled material except pursuant to an authorized controlled material order valid for the calendar quarter in which delivery is requested, unless the quantity of material to be delivered on any one sale to any one person is for a quantity of material which is less than 10% of a standard package. Only sales on authorized controlled material orders are replaceable under the provisions of section 4 (b) of this order.

Federal Agencies Want Technical Men

The Civil Service Commission has announced a new examination for filling chemist, physicist, metallur-

gist, mathematician, and electronic scientist positions in various Federal agencies in Washington, D. C., and vicinity. The salaries range from $3,410 to $10,800 a year.

★ ★ ★

No written test is required. To qualify, applicants must have had 4 years of appropriate college study, or 4 years of appropriate experience or a combination of education and experience. In addition, for positions paying $4,205 and above, they must have had professional experience in the field for which they apply. Pertinent graduate study may be substituted for all or part of this experience. Senior or graduate students may apply if they expect to complete their courses within 6 months. For the $3,410 positions, applicants must not have passed their 35th birthday, and for the higher grades, their 62nd birthday (waived for persons entitled to veteran preference).

★ ★ ★

Further information and application forms may be secured at most first- and second-class post offices, from civil-service regional offices, or from the U. S. Civil Service Commission, Washington 25, D. C. Applications should be sent to the Executive Secretary, Board of U. S. Civil Service Examiners, National Bureau of Standards, Washington 25, D. C. They will be accepted until further notice.

Government-Industry Program

The Government-industry program to step up production of metals and minerals vital to the defense and economic progress of the free world has made substantial progress toward meeting presently-known needs, Jess Larson, Administrator of General Services and of the Defense Materials Procurement Agency, said recently.

★ ★ ★

As of May 1, **Mr. Larson** said, DMPA had received a total of 1,622 applications for Government assistance. Of these, 455 had been withdrawn and 605 denied. A total of 369 had been approved and put into effect. The remainder were in various stages of processing.

★ ★ ★

Agreements involving some form of Government assistance and the increased production expected to result from them were summarized

AMERICAN CHEMICAL PAINT COMPANY
AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet
Subject: IMPROVED DRAWING AND COLD FORMING WITH GRANODRAW

INTRODUCTION:

When steel is phosphate coated with "Granodraw" prior to working it, drawing, extrusion, and other cold forming operations are greatly improved. In fact, the protective phosphate coating makes the cold extrusion of steel possible.

Getting cold steel to flow depends on the unique properties of this coating. Its non-metallic phosphate crystals are physically and chemically adapted to acquire a strongly adsorbed lubricant. The combination of adherent phosphate coating and adsorbed lubricating film possesses a low coefficient of friction while maintaining its integrity under extremely high deforming pressures.

The drawing of wire and many other cold forming operations — including the cold extrusion of steel — are greatly facilitated by the application of a "Granodraw" phosphate coating and a suitable lubricant prior to working.

"GRANODRAW" DATA

"Granodraw" zinc phosphate coating chemical is applied to pickled surfaces in an immersion or spray process. When used with a suitable lubricant, the coating reduces friction under conditions of low, medium, or high deforming forces encountered in such typical operations as: cold extrusion of steel; cold shaping; deep drawing (tubs, cartridge cases, shells, etc.); stamping; drawing of wire and tubing; ironing; necking; nosing; and upsetting.

ADVANTAGES OF PHOSPHATE COATING WITH "GRANODRAW" PRIOR TO COLD FORMING STEEL

The following are among the advantages indicated for phosphate coating with "Granodraw" prior to cold forming steel:

Drawing of wire, bars, tubing, etc. — Improved lubrication; improved surface; less scratching; reduced pull; greater percent reduction per pass; reduced die wear; longer die life; lower die maintenance and cost; reduction in corrosion.

Drawing of stampings, shells, shell cases, etc. — Improved lubrication; reduced breakage; reduction in scrap; deeper draws; less scratching; elimination of some annealing; less wear on dies.

Cold Extrusion — Improved lubrication; increased strength of parts; improved surface; reduction in load on press; greater dimensional accuracy; more uniform wall thickness; longer extrusions; elimination of some annealing; less corrosion.

CHEMICALS ACP PROCESSES

WRITE FOR FURTHER INFORMATION ON "GRANODRAW" AND ON YOUR OWN METAL PROTECTION PROBLEMS.

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Cover non-metallic sheathed cable, building wire and weatherproof wire

1800 feet an hour

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Model C-3H Knitter & Haul-Off Reel Stand

- ★ Increase speed 10-15 times
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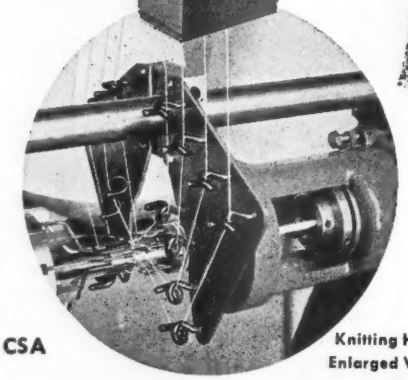

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This *Fidelity Sinfra* Wire Covering Machine offers you high production speed and low operating cost. The output of *one* Knitter equals 15 conventional machines. Savings in yarn costs and direct labor alone pay for this new equipment in 12 to 24 months. Knit products are universally used and meet all standards.

The modern Fidelity Sinfra method uses fewer yarns and large 3 pound cones located on a stationary creel. High-speed, rotating Knitting Heads cover the wire at 30 or more feet per minute. Design permits horizontal operation at convenient working level with no crawling or stretching. Automatic electric stop motions and other advanced features cut maintenance and down time.

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by Mr. Larson with respect to seven strategic metals and minerals. Mr. Larson emphasized that figures on anticipated increases relate only to contracts consummated up to now. Additional expansion for metals and minerals for which production is not deemed to be adequate are being negotiated.

★ ★ ★

The summary follows:

Copper: Six commitment-to-purchase contracts, one loan and 12 certificates of necessity are expected to result in an additional 400,000 short tons of copper for the period 1951-1956 inclusive, with a maximum annual expansion by 1956 of 165,200 tons. Five maintenance-of-production contracts have been approved to maintain output from existing operations during 1952 and 1953 that otherwise would have had to shut down, because of unusually high production costs. Pre-Korea copper consumption in the U. S. ran about 2,000,000 short tons a year.

Chrome: One purchase depot has been established to buy chrome ore at an over-market price and one commitment-to-purchase contract has been negotiated for 900,000 short tons of chrome ore for the period 1952-1956. Pre-Korea consumption of chrome was about 950,000 short tons.

Cobalt: Seven domestic and foreign contracts, with advances against production, and one certificate of necessity are expected to result in an additional 22,313,000 pounds of cobalt during the 1951-1956 period with a maximum annual assisted production of 5,126,000 pounds by 1954. Pre-Korea consumption was about 10,000,000 pounds a year.

Fluorspar (Acid-grade): Expanded production of 240,000 short tons over the 1952-1956 period is expected to result from two guaranteed floor price contracts and four certificates of necessity. Maximum annual production resulting from these commitments is estimated at 60,000 short tons in 1955. Pre-Korea consumption —about 155,000 short tons.

Iron Ore: Expanded production of 41,000,000 long tons of iron ore annually by 1955, and 7,800,000 long tons of taconite annually by 1956, is expected to result from 106 certificates of necesity. Pre-Korea consumption — about 103,000,000 long tons.

Lead: Expanded supply of lead is the result of one commitment-to-purchase contract from a foreign source and 22 certificates of necessity, some of which are primarily assistance to zinc production. Maximum annual expansion of production by 1955 is estimated at 50,000 short tons with a total accumulative increase for 1951-1956 of 194,600 short tons of lead. Pre-Korea consumption—about 1,250,000 short tons.

Nickel: Four commitment-to-purchase contracts, domestic and foreign, and one certificate of necessity are expected to result in a total of 112,750 short tons of nickel during the 1951-1956 period, with maximum annual expansion in production by 1956 of 28,900 tons. Some of this assistance is responsible also for part of the expanded cobalt production. Potential production now under review would add approximately 45,800 tons annually by 1956. Pre-Korea consumption—about 101,000 short tons.

Manganese Ore: Three purchase depots have been established; at Butte and Philipsburg, Montana, and at Deming, New Mexico, and one in Wenden, Arizona,

is being set up to assist production from small properties in these areas. Other assistance to manganese producers includes nine accelerated tax amortization certificates, one commitment-to-purchase contract, numerous small purchase and resale contracts with advances against production, and one loan. Total expanded production resulting from this assistance over the 1951-1956 period is estimated at 1,070,000 long tons with a maximum annual expanded production of 247,000 tons by 1953. Pre-Korea consumption—about 1,850,000 long tons.

Titanium: Production of this presently high cost "wonder metal" has been assisted by three certificates of necessity and one commitment-to-purchase contract with an advance against production, and a revolving fund of $5,000,000 has been established for short-term purchase and resale of sponge. This assistance is expected to result in 19,150 short tons additional primary titanium over the 1951-1956 period with a maximum annual production of 4,510 short tons by 1954. Plans for still greater expansion to start in 1953 are under consideration. Pre-Korea consumption—about 140 short tons.

Tungsten: Tungsten production has expanded following the assurance of a guaranteed price of $63 per short ton unit of tungsten trioxide authorized May 10, 1951, under a domestic purchase program. This action plus other domestic assistance, three certificates of necessity, three loans, and one commitment-to-purchase contract, will increase the total supply of tungsten substantially. Pre-Korea consumption — about 12,500,000 pounds.

Zinc: Total expanded production of zinc through Government assistance is estimated at 856,600 short tons over the 1951-1956 period with a maximum annual expansion of 214,500 tons by 1954. Assistance has been given by three loans, 34 certificates of necessity, and eight commitment-to-purchase contracts. Pre-Korea consumption—about 1,100,000 short tons.

★ ★ ★

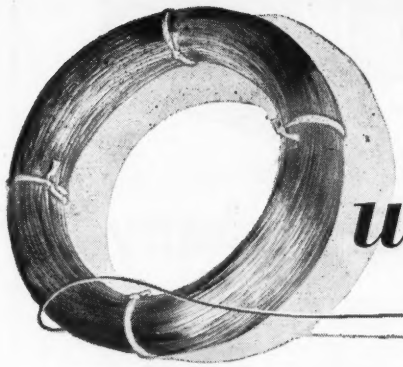
Mr. Larson called attention to the fact that in the case of certain metals and minerals, current expansion programs not only represent net production increases but also are designed, in part, to offset normal depletion of current sources of supply. He cited as an example the exhaustion of large sources of tungsten in Idaho during World War II. As a result, new sources of supply are being developed.

★ ★ ★

"**Even** when deposits of metals or minerals are known to exist, expansion of production facilities or installation of new facilities—whether because of the large tonnages that must be handled or because of the difficulties of processing—is usually a pretty costly and time-consuming business," Mr. Larson pointed out.

★ ★ ★

"**Sometimes** companies need long-term financial assistance that is not available from private lenders; sometimes they need only a guaran-



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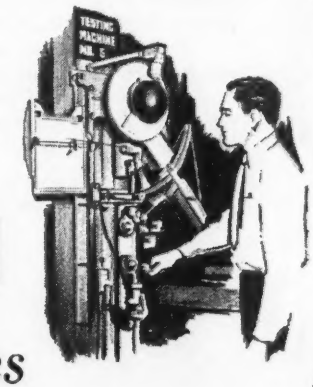
Specialty Wires



Not only Music Wire, "the wire of a thousand uses," but a complete line of quality specialty wires is made by Johnson, including vacuum hose wire, aircraft cable wire, high carbon rope wire, hard drawn spring wire, oil tempered spring wire, high tensile galvanized steel wire, hose reinforcement wire (braided type), flat and half oval special spring wire, brush wire for hand and power brushes.

"Johnson Sets the Standard of the Industry"

JOHNSON

JOHNSON STEEL and WIRE CO., INC.

Worcester 1, Massachusetts

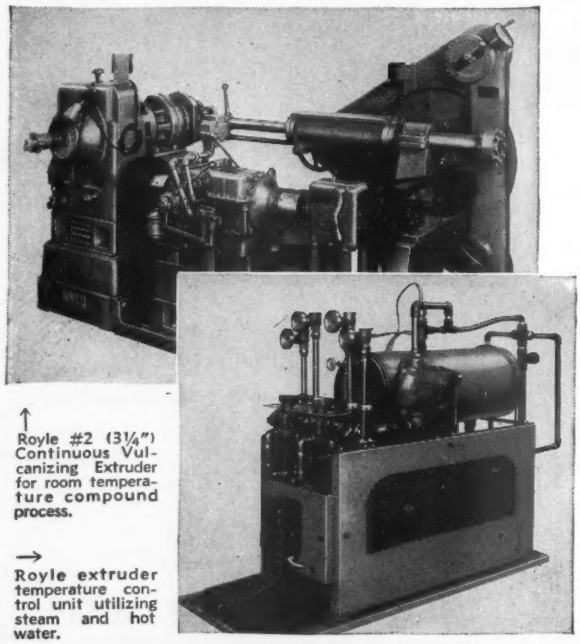
SUBSIDIARY OF PITTSBURGH STEEL COMPANY

Of Particular Importance

To the Wire Insulating Industry

The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

- Improved diameter control
- Reduction in compound scrap
- Reduction in electrical faults
- Permits storage of completely mixed compounds
- Permits more economical scheduling of mixing equipment
- Eliminates "warm-up" operation
- Possible mill-room economies
- "Hot" machines may be converted
- Finished product has smoother finish—better appearance

Licensees of Western Electric Company

JOHN ROYLE & SONS
10 ESSEX STREET, PATERSON 3, NEW JERSEY

tee that if they invest in the additional facilities they will have a market for a portion of their production at a feasible price; sometimes because of cost and other factors they need more rapid amortization for tax purposes than would normally obtain before they can see their way clear to undertake the desired expansion.

★ ★ ★

"Before it recommends Government financial assistance, the Defense Materials Procurement Agency first ascertains that without such assistance the desired expansion would not be accomplished; then it looks at the problem from all standpoints to determine the kind of assistance that will get the results at the least cost to the Government."

★ ★ ★

DMPA has under consideration a number of agreements similar to those already negotiated. The agency is working on approximately 75 metals, minerals and rare earths.

Better Steel Through Hydrogen Elimination

Studies on how to overcome the porosity and brittleness produced in steel by hydrogen are described in two Government research reports now available to the public, the Office of Technical Services, U. S. Department of Commerce, announced recently.

★ ★ ★

Hydrogen gas present in steel has long been known to cause porosity and brittleness. To overcome this difficulty, the Office of Naval Research wanted to find out first how much hydrogen can be tolerated in steel before the porosity and brittleness became objectionable. This, in turn, called for development of quick techniques for analyzing the hydrogen content in steel.

★ ★ ★

Scientists at Massachusetts Institute of Technology, to whom this problem was assigned, came up with a commercially practical technique —that is, a procedure for analyzing steel for hydrogen that takes only fifteen minutes and is as simple as standard tests for carbon, sulfur, or manganese content. "The Analysis and Sampling of Liquid Steel for Hydrogen" is the title of the report which describes this development. With the analytical apparatus described, precision of 1 part per mil-

lion for a 2-gram sample is obtainable.

★ ★ ★

To overcome the difficulty of keeping the liquid steel sample so that the analytical results would be a true picture of the sample's hydrogen content, the MIT scientists developed an induction-heated apparatus in which the liquid metal could be kept under a controlled atmosphere and from which samples could be taken without exposure of the liquid metal to air. This development is also described in the report. It was found that the new analytical technique and sampling procedure together are very well suited to process control of hydrogen in commercial melting furnaces.

★ ★ ★

Using the above analytical and sampling techniques for hydrogen content, another group of MIT scientists studied the effect of different hydrogen contents on the mechanical properties of steel and presented some speculations as to the mechanism by which the hydrogen brings these changes about. The report in which their work is described is entitled "Hydrogen Embrittlement of SAE 1020 Steel."

★ ★ ★

Pb 105103, The Analysis and Sampling of Liquid Steel for Hydrogen, 96 pages including photos, line drawings and graphs, sells for $4.25 in microfilm and $12.50 in photostat form.

★ ★ ★

Pb 1052290, Hydrogen Embrittlement of SAE 1020 Steel, 30 pages, including line drawings and graphs sells for $3.75 in photostat and $2.00 in microfilm form.

★ ★ ★

Orders should be addressed to the Library of Congress Photoduplication Service, Publication Board Project, Washington 25, D. C. Enclose check or money order payable to the Librarian of Congress.

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Your Order Now
for the
1952 Wire Buyers Guide

AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: EFFICIENT PICKLING WITH RODINE®

ADVANTAGES OF "RODINE"

RODINE is used in sulfuric and muriatic acid baths for improved pickling and increased production. It meets Government Specification U.S.N. 51-I-2.

In straight line pickling of wire, rod and tubing, RODINE makes available more metal for drawing by protecting steel from acid attack. In batch pickling of sheet steel, RODINE improves the surface. In rapid, continuous strip pickling, RODINE not only saves acid and metal, but also prevents over-pickling during line shutdowns.

◀ *This steel surface was pickled in an uninhibited acid bath. Note the deep pits, and that the surface is visibly crystalline.*

This surface was pickled exactly like the one above except that "RODINE" was added to the acid solution. Only scale pockets and roll marks are visible; no pitting occurred. ▶

CHEMICALS ACP PROCESSES

WRITE FOR DESCRIPTIVE FOLDER ON "RODINE" AND INFORMATION ON YOUR OWN PICKLING PROBLEM.

CHEMICALS ACP PROCESSES

Outstanding Personalities of the Wire Industry

John Moritz Honored

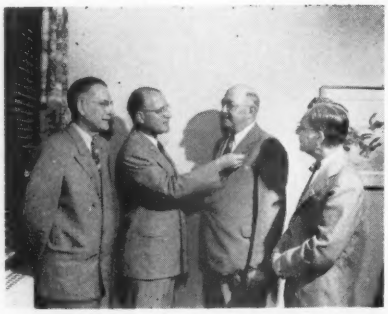
John A. Moritz, 707 South Fifth Street, Pekin, Illinois, was honored on May 16th, when he was given a service pin commemorating 40 years continuous employment with the **Keystone Steel & Wire Company.** The presentation was made by R. E. Sommer, president and general manager.

★ ★ ★

At a recent meeting in Pittsburgh, Pennsylvania, Mr. Moritz was elected President of the **Wire Association,** an international organization having 950 members, in the United States, Canada, England and elsewhere abroad.

★ ★ ★

John began his employment with Keystone in 1912, when the company had only about 100 employees, starting as a laborer. In 1916 he became foreman of the Galvanizing Department. Three years later he was made foreman of the fence and barbed wire departments. Then, in 1920, the fabric department was added to his foreman responsibilities.



Receiving diamond pin from Mr. Sommer. From left to right: D. P. Sommer, executive vice president; R. E. Sommer, president; John A. Moritz, and Henry G. Sommer, chairman of the board.

In 1928 John was transferred to the **Mid-States Steel & Wire Company** at Crawfordsville, Indiana, to assume the role of superintendent. Six years later he was elevated to the position of vice president in charge of operations at Mid-States.

★ ★ ★

In the year 1936 he returned to the Keystone Steel & Wire Company, Peoria, Illinois, to become the superintendent of the Keystone wire mills, a position he has held ever since. Today 1300 men are employed in the wire mills.

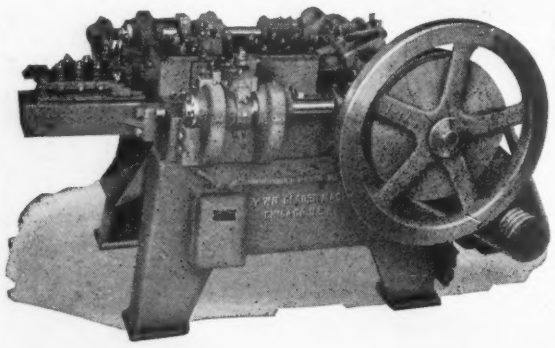
★ ★ ★

John A. Moritz is a Mason, is a member of the Pekin Country Club and the Peoria and Pekin Associations of Commerce. Hunting, fishing, and golfing consume most of his leisure hours. He is married and has two children, a son John Jr. of Chicago Heights and a daughter Mrs. Arlene Whitmarsh of Jacksonville, Florida.

Shakeproof Appointments

Walter M. Hanneman was appointed executive engineer of **Shakeproof Inc.,** division of Illinois Tool Works, Chicago. **William B. Dennis-ton** was appointed manager of distributor sales. They will both be located at Elgin, Ill.

GLADER HIGH SPEED WIRE NAIL MACHINE



MACHINE ARRANGED FOR INDIVIDUAL MOTOR DRIVE

High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

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Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

Made Sales Development Supervisor

Carl F. Olson has been appointed sales development supervisor for insulating materials at the **General Electric Company's** chemical division alkyd resin products plant at Schenectady, N. Y., according to an announcement by **Frank L. McAuliffe**, alkyd resin products interworks sales manager.

★ ★ ★

A 1941 graduate of the Massachusetts Institute of Technology with a B.S. in chemistry, Mr. Olson started with General Electric in 1941 doing development work at the Lynn River Thompson Laboratory. From October 1942 until May 1948 he was engineer in the wire and insulating department there, and then moved to the Philadelphia office of the chemical division's interworks sales. In January 1950 he went to Schenectady as sales development supervisor on Permafil, an insulating material manufactured at the alkyd resin plant, and in November of the same year he went into sales analysis and planning there, the position he held prior to his present appointment.

Heads Sales for Aluminum Concern

M. L. Boccalatte has just been appointed Sales Manager of the **Aluminum Wire Products Co. Inc.** of Glastonbury, Conn. M. Boccalatte will represent the Aluminum Wire Products Co. throughout the East, South and Middle West in furthering sales of all forms of extruded aluminum wires and specializing in welding and brazing wires.

Medal Award For 1951 Goes To Bruce Gonser

For the most meritorious paper on wire manufacture or fabrication during the year of 1951, the Medal Award has been given by the Medal Award Committee of The Wire Association to Bruce W. Gonser, Research Supervisor, Non-Ferrous Metallurgy, Battelle Memorial Institute, Columbus, Ohio. The presentation of the medal will be made at the next annual convention in November. Dr. Gonser's paper was entitled "High Strength Copper-Silver, Copper-Iron and Copper-Iron-Chromium Wire." Webster Hodge of the Institute was co-author.

★ ★ ★

At the same time the Committee announced the selection for honorable mention of the best ferrous paper: "Surface Active Agents and Pickling Brittleness" by Carl A. Zapffe, M.S., Sc.D., and M. E. Haslem, consulting metallurgists, of Baltimore, Maryland, and for the best non-ferrous paper: "Some Developments in Nylon and Polyethylene Wire Extrusion" by C. A. Litzler, President of Industrial Ovens, Inc., Cleveland, Ohio. Suitable certificates of honorable mention will be presented to Messrs. Zapffe and Litzler at the annual convention.

— WIRE MEN —

Join THE WIRE ASSOCIATION and enjoy the benefits of affiliation with other men engaged in wire production work.

Use **"ALBRO" METAL** *for Long Life and Economy in Pickling*

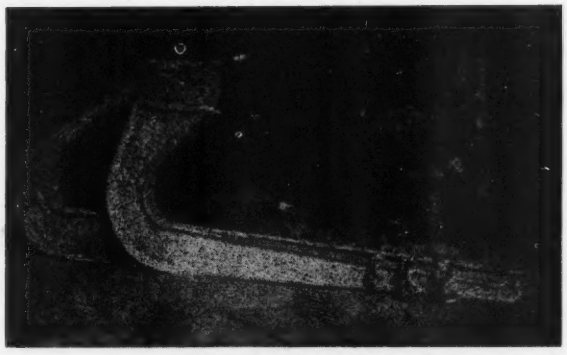
for: HAIRPIN HOOKS • PICKLING CHAINS • BASKETS, ETC.

They last! You can cut your hook costs in half. "ALBRO" METAL IS extremely resistant to acid corrosion — and very strong.

One customer used our hooks for 5 years and ordered 20 more — the corrosion over that period had been negligible.

We extend to you an opportunity to avail yourselves of our engineering co-operation. We build to your specifications.

Send us your drawings. Or wire, write or telephone, asking to have a representative call on you.



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Naugatuck Chemical Appointments

Appointment of **Robert P. White** and **Carl W. Virgin** as technical sales representatives for Marvinol, Kralastic and Vibrin resins for **Naugatuck Chemical Division, United States Rubber Company**, has been announced.

★ ★ ★

Mr. White will make his headquarters in Naugatuck Chemical's main plant in Naugatuck, Conn., and cover Connecticut, western Massachusetts, upper New York state and Vermont.

★ ★ ★

Mr. Virgin will make his headquarters at Naugatuck Chemical's branch office in 254 Fourth Avenue, N. Y. C. and cover the New York metropolitan area.

Carboloy Names Field Sales Manager and Midwestern District Manager

Two new appointments to the position of Field Sales Manager and Mid-western District Manager have been announced by **K. R. Beardslee**, general manager of **Carboloy Department of General Electric Company**, Detroit 32, Michigan.

★ ★ ★

Frank J. Staroba has been named field sales manager with headquarters in Detroit. In his new position Staroba heads the national field sales organization for the Carboloy Department. He was formerly Midwestern District manager. He joined Carboloy in 1932 following mechanical engineering studies at the University of Illinois.

★ ★ ★

L. L. DeCoster becomes midwestern district manager with headquarters in Chicago succeeding Staroba. He joined Carboloy in 1946 and spent two years as an instructor in the Carboloy Customer Training School.

WIRE SPOOLS, ALL-STEEL, LITHOGRAPHED

Ends and traverses may be shipped separately and assembled easily in your plant on a hand, foot, or power press.

5" and 6½" diameter ends with 1-15/16" diameter traverses.
10½" diameter ends with 3½" diameter traverses.
Traverse lengths up to 12".

J. L. CLARK MANUFACTURING CO.
600 23rd AVENUE • ROCKFORD, ILLINOIS

Heads Sales for Spencer Wire

The Spencer Wire Company, New York, N. Y., has appointed William C. Shattuck as manager of sales, steel wire. The company currently is expanding its production facilities to care for the added demands of their customers.

★ ★ ★

Bill Shattuck comes to them from the General Cable Corporation, where he handled bare wire sales, but is better known for his long association with the Wickwire-Spencer Steel Division of Colorado Fuel and Iron and John A. Roebling's Sons Company, where he worked in a similar capacity.

Donnelly Elected Head of Gas Appliance Group

James F. Donnelly, an executive of the **A. O. Smith Corp.,** was elected president of the Gas Appliance Manufacturers Association at the opening session of the group's 17th annual meeting in May.

★ ★ ★

Mr. Donnelly succeeds **Louis Ruthenberg,** chairman of the board of Servel, Inc. He is assistant general manager of the Kankakee, Ill., division of Smith, served during the past year as GAMA's second vice president.

Becomes Chief Bridge Engineer for Roebling

Charles C. Sunderland, chief bridge engineer for the **John A. Roebling's Sons Company,** who has retired after more than a half-century of service, has been succeeded by **Blair Birdsall,** assistant chief

bridge engineer since 1940.

★ ★ ★

Announcement of the changes were made in May by **Ferdinand W. Roebling, III**, vice president in charge of engineering.

★ ★ ★

Mr. Sunderland was considered one of the world's foremost bridge engineers, having begun his career as a draftsman in the Roebling Bridge and Tramway Department. During Mr. Sunderland's service with Roebling, the Company completed such major contracts as the main cables of the George Washington Bridge, the Golden Gate Bridge, and the Tacoma Narrows Bridge.

Jessel S. Whyte

The MacWhyte Company of Kenosha, Wis., has announced with deep regret the passing on May 28, 1952 of its President and General Manager, Jessel S. Whyte.

★ ★ ★

Mr. Whyte, 61 at the time of his death, was one of the most progressive industrialists in the wire industry and a leading civic figure in Kenosha.

★ ★ ★

He was a graduate of Cornell University and took a post graduate course in metallurgy at Sheffield University, Sheffield, England. Mr. Whyte had been described as "a dynamo of human activity" and he gave liberally of his time and means to his Alma Mater, having been President of the Cornell Alumni Fund Council at the time of his demise.

★ ★ ★

In his own business he served his apprenticeship in the mills and worked his way from the bottom to the top of his company in the long period of his dynamic career.

Arthur M. Long

Arthur M. Long, aged 63, assistant general manager of sales for **The Youngstown Sheet and Tube Company**, died suddenly at his home, 1500 Hinman Ave., Evanston, Ill., on May 24th of a heart attack.

★ ★ ★

Mr. Long, a native of Chicago, attended public schools there and received a degree in civil engineering from Cornell University. He began his steel career at the age of 22 with Jones & Laughlin Steel Corporation in Chicago and later went with Trumbull Steel Company in Warren.

★ ★ ★

On April 1, 1926, Mr. Long joined The Youngstown Sheet and Tube Company as manager of tin plate sales with headquarters in Chicago. In 1930 he was appointed assistant general manager of sales, and six years later was transferred from Chicago to the company's general offices in Youngstown.

★ ★ ★

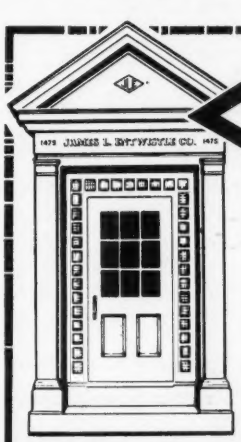
Five years ago Mr. Long was transferred back to the Chicago district. From October, 1950 to March, 1951, Mr. Long was in Washington as chief of the tin plate branch, steel division of the National Production Authority.

Daniel S. Whiteman

Daniel S. Whiteman, one of the founders and Chairman of the Board of Reilly-Whiteman-Walton Company of Conshohocken, Pa. died suddenly on the evening of May 30th, 1952. Mr. Whiteman enjoyed good health until the time of his death, which came at the age of 58.

★ ★ ★

He served in the Army Ordnance during the First World War, and then returned to Lehigh University where he graduated as a mining en-



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SERVING THE WIRE INDUSTRY THROUGHOUT THE WORLD

- Caterpillar Pull-outs
- Standard Sets of Spark-Testing Equipment
- Take-ups and Re-spoolers
- Reelers
- Coilers
- Spoolers
- Collapsible Coiling Reels
- Wire Sparkers and Accessories
- Hand Locators
- Electrode Units and Stands
- Measuring Machines, Counters and Accessories
- Wire Guide Units
- Pay-off Reels Stands
- Electronic Devices
- Shaftless Take-ups and Payoffs
- Wire Pre-Heater
- Disk Brakes and Controls, Drag Units and Slip Clutches
- Wire Marking Machines, Type Strips, Inks
- Labelling Machines
- Pneumatic Equipment and Controls
- Special Machinery for the Wire Industry
- Hydraulic Equipment and Controls
- Hi-Pot Test Sets
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SEE PAGE 668 for news of the HEAVY DUTY Automatic Re-reeling, Spark-testing & Measuring Equipment

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gineer.

★ ★ ★

In 1923, Mr. Whiteman and the late P. F. Reilly formed the Reilly-Whiteman-Walton Company for the purpose of manufacturing industrial process oils. He was active in his company until his death.

E. R. Garofalo

Emil R. Garofalo, 53 president of the **Wiretex Manufacturing Company,** Bridgeport, Conn., wire products manufacturers, died on May 14th at his home.

★ ★ ★

Mr. Garofalo established his own business about 20 years ago and constructed his own factory in Fairfield a few years ago.

Kaiser Issues Brochure on Aluminum Metallurgical Research

In a 36 page illustrated brochure, The Kaiser Aluminum and Chemical Corporation of Spokane, Washington, has described interestingly the work of its Division of Metallurgical Research.

Starting with a brief historical sketch of the discovery and development of aluminum as a utilitarian metal, the aims and objects of this division are set forth, followed by chapters on each branch of its work, all leading toward improved methods of production and fabrication, new attributes and applications, and new alloys to satisfy the varied needs of home and industry in their uses of aluminum.

"The Grinding Wheel"

This book, written for the Grinding Wheel Institute of Greendale, Mass., by Kenneth B. Lewis, Consulting Engineer, is a textbook on modern grinding practice.

★ ★ ★

It contains 409 pages of text matter, divided into 28 chapters, an appendix and an index, and sells for $3.50 a copy.

★ ★ ★

The author starts with a general dissertation on grinding, goes into one on abrasive materials, and then treats of the various operational categories in which grinding wheels are used. Concluding chapters treat respectively of product design for grinding, the grinding of non-metallic substances, miscellaneous other applications and costs.

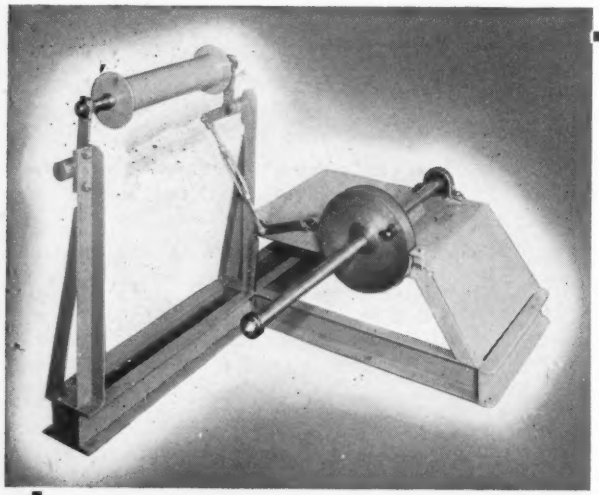
★ ★ ★

Written in the typical scintillating Lewis style, the subject-matter, which very easily could be deadly-dull, is highly readable, while at the same time imparting highly valuable information in a manner readily assimilated. Both the author and the Institute are to be congratulated for their comprehensive and instructive contribution to a knowledge of this important subject.

New Brazing Alloy

Handy & Harman, New York, has announced the development of a new metal joining composition to be known as "EB" Silver Brazing Alloy. It is primarily intended for use in brazing chromium carbide, cast carbides and other "hard-to-wet" carbides. Effective results have also been obtained on high tungsten-copper alloy, cer-mets and other refractory alloys difficult to braze.

★ ★ ★



FEDERAL ANNOUNCES IMPROVED

PAY-OFF for RE-SPOOLING

This PAY-OFF stand is rugged and well-made. Can be had with air or electric brake. Constructed so that constant tension is always maintained. Available for any height of wire line. Ideally suited to efficient and accurate respooling operations.

FEDERAL PAY-OFFS are reasonably priced.

Send for full information

FEDERAL EQUIPMENT

- CAPSTANS
- PAY-OFFS
- SINGLE & DOUBLE TAKE-UPS
- ELECTRODES
- CORD SET TESTERS
- SPECIAL TESTING EQUIPMENT
- MEASURING MACHINES
- LACQUER TOWERS

Federal Manufacturing Co.

SPECIAL WIRE MACHINERY

236-240 Hall Avenue, Wallingford, Conn.

The new alloy is composed of 57% silver, the balance of the composition includes copper, manganese and tin. It has a melting point of 1120°F. and a flow point of 1345°F.

★ ★ ★

There are no volatile elements in this alloy, an important factor in vacuum applications, and it is nonsusceptible to dezincification type of corrosion. It has been successfully used on Type 316 stainless steel subject to dilute mineral acid corrosion. This does not imply a general recommendation for corrosive service but does indicate a quality which may prove useful when evaluated by tests under actual service conditions.

Vascoloy-Ramet Starts Big Carbide Expansion

Ground was broken May 23 at Waukegan, Illinois for a large new building which begins a major expansion and improvement program for **Vascoloy-Ramet Corporation.**

★ ★ ★

"Although our immediate objective is to increase productive capacity by 50 per cent," stated Robert J. Aitchison, president of Vascoloy-Ramet and its parent company, Fansteel Metallurgical Corporation, "the broader objective is to mechanize and streamline operations, to save time, speed deliveries, and reduce manufacturing costs.

Ground was broken May 23 to start an addition to the Vascology-Ramet Corporation plant at Waukegan, Illinois. Left to right: George Swanson, general contractor; Herbert B. Clark, president of Vascoloy-Ramet Corporation; A. Epstein, engineer; Robert J. Aitchison, president of Fansteel Metallurgical Corporation; Dr. Frank H. Driggs, Fansteel executive vice president; Sidney Epstein, engineer.

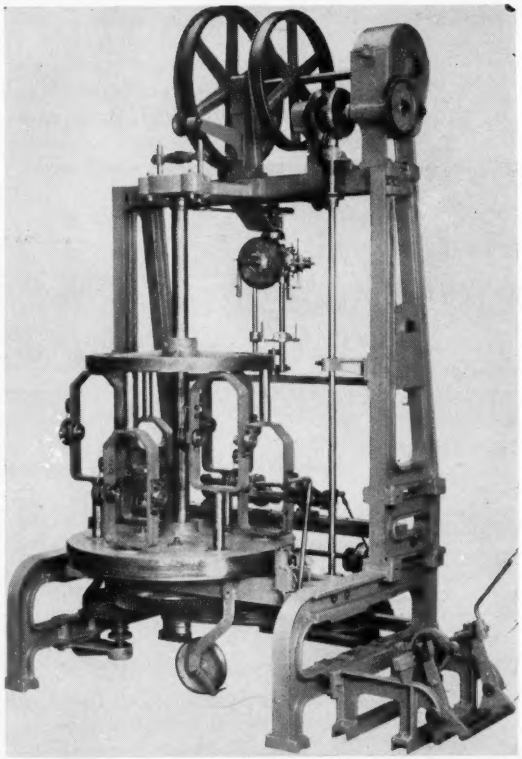
"This is the largest single construction and equipment program in the refractory metal carbide industry since 1937, and will provide Vascoloy-Ramet with the most modern, most compact, and most efficient plant of its kind in the United States—probably the world."

★ ★ ★

When the program is completed late in 1952, the Vascoloy-Ramet plant will have completely modern facilities for the production of carbide cutting tools, blanks and wear-resisting parts, wire and tube drawing dies, mining and rock tools, Tantung (cast alloy) cutting tools and custom-made intricate castings.

★ ★ ★

The present Vascoloy-Ramet plant is being remodeled so that it and the new facilities will be integrated. Existing equipment is being rearranged and new equipment added so that production will flow smoothly in straight lines. Conveyor systems will eliminate manual material handling. Facilities for research and technical control laboratories will be quadrupled. Much of the plant, particularly the sections which work



Pourtier Assembling Machines

OF INTEREST TO CABLE MANUFACTURERS:

OUR VERTICAL ASSEMBLING MACHINE—WITH DE-TORSION

IT IS:

- noiseless because driven by V-belts;
- highly productive because handles large drums;
- safe because of friction and automatic stop motion;
- easy to operate because equipped with a regulated traverse; and
- efficient because 3 papers or 1 cotton can be applied after the assembling operation.

Has Haul-off Capstan 24" Diam.
Built with 4, 6, 8, 12 and Bobbins.

Inquire about prices and delivery.

POURTIER MACHINES

153 Rue Gallieni
ROMANVILLE • SEINE, FRANCE

in powdered metals, carbides and compacts, will be air-conditioned, with controlled temperature and humidity and elimination of dust.

★ ★ ★

A new entrance to the plant will be provided, with a modern lobby containing displays of Vascoloy-Ramet products. The shipping and receiving docks, with space to accommodate three large trucks, will be enclosed. Employees' rest rooms, first aid rooms and cafeteria will be modernized. The boiler house for heating and process steam will be remodeled and relocated.

★ ★ ★

The project is being conducted by the company's plant engineering force in cooperation with A. Epstein and Sons, engineers. The general contractor is George Swanson & Son.

"Machinery and Equipment For Rubber and Plastics"

Volume I of this book was recently published by **India Rubber World,** 386 Fourth Avenue, New York. It contains 804 pages and sells for $15.00 a copy in the U.S.A. and $16.00 abroad.

★ ★ ★

The editors, **Robert G. Seaman** and **Arthur M. Merrill** have done a monumental job in collecting information on the rubber and plastics industry. The book treats of the principal phases of rubber and plastic product manufacture and presenting comprehensive engineering information on the primary machines used for rubber and plastic processing.

★ ★ ★

Each major branch of the industry is treated in a separate chapter —of which there are twenty—one in particular, Chapter 17, devoting thirty-one pages to wire and cable machinery. In this, through text, charts, illustrations and tables such items as braiders, looms, sewers, coaters, stranders, finishers, stippers and other processing equipment are described. A special chapter is devoted to extruders, strainers and CV units.

★ ★ ★

The book has been particularly compiled for those who are responsible for the processing of these materials into finished products. Each chapter starts with a general treatise on its subject prepared by recognized authorities, followed by sections in which the equipment made by various manufacturers is described in detail from an engineering standpoint.

★ ★ ★

This book may be safely said to contain the finest collection of classified information for plastic and rubber production men gathered between two covers.

A Correction

On page 102 of the 1952 edition of the WIRE AND WIRE PRODUCTS BUYERS' GUIDE, there appears a regrettable typographical error in the text describing the No. 4 Davis Spark Tester.

It is stated that the sparker is supplied on order with a voltage up to 3000. This should have read "up to 30,000" volts.

The Davis Electric Company, of which John J. Porto is president, is the successor to the R. L. Davis Electric Company. Mr. Porto and his associates purchased and continued the manufacture of the nationally known line of Davis equipment shortly following the death of R. L. Davis. We sincerely trust that the Davis Electric Company and its customers have been occasioned no inconvenience through this error.

When wrapping your wire or rod

...REMEMBER

It's the

Crinkle in the PAPER that COUNTS!

For a tighter, more compact wrap, specify— "Arksafe" CRINKLED KRAFT WIRE WRAP

Easy to handle, simple to apply. Uniform crepe—Strong and *Economical*, too!

CONSTRUCTION: Single ply, waxed, asphalt laminated and reinforced.

In Standard Rolls and Widths for use on all types of wrapping machines. Also available in Hand Rolls.

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CHICAGO, ILLINOIS • NEWPORT NEWS, VIRGINIA

Distributed by: ADDISON ASSOCIATES

572 WASHINGTON STREET, WELLESLEY 81, MASS.

Heavy Duty Heads for Measuring Very Low Speeds

Rugged, heavy duty tachometer heads for measuring speeds as low as a fraction of an RPM are now available. These new Series 57M Heads, when used with Metron tachometer indicators, recorders, or controls, are ideal for measuring speeds of extruders, welders, kilns, conveyor belts, ovens, dryers, and similar installations where ruggedness counts in low speed measurement. Built in gearing permits direct engagement of very low speeds without need of speed changing drives. Speeds up to 199 RPM for full scale indication can be measured. Overspeeding of 2 to 10 times rated values results in no damage whatsoever.

★ ★ ★

The stainless steel head shaft is ¾ inch in diameter and supported in large, sealed ball bearings. The head casting is anodized aluminum having ⅜ inch wall and heavy mounting feet to insure stability of initial alignment. The built in gears are specially designed for long life, minimum wear, high tooth strength, and quiet running.

★ ★ ★

All working parts and terminals are completely enclosed against dirt, abrasives, and splashing liquids. Electrical connections between the head and speed indicator can be up to 1,000 feet or more and provisions are made for employing conduit or armored cable. Connections to the head can be made from any one of four approaches and the head can be mounted in any position.

★ ★ ★

Stable performance is assured over a wide range of temperature, humidity, vibration, or magnetic fields. Permanent lubrication for an extreme temperature range is employed throughout. All heads of the same type number are completely interchangeable and require no special matchings.

★ ★ ★

New Right-Angle Worm-Gear Motor

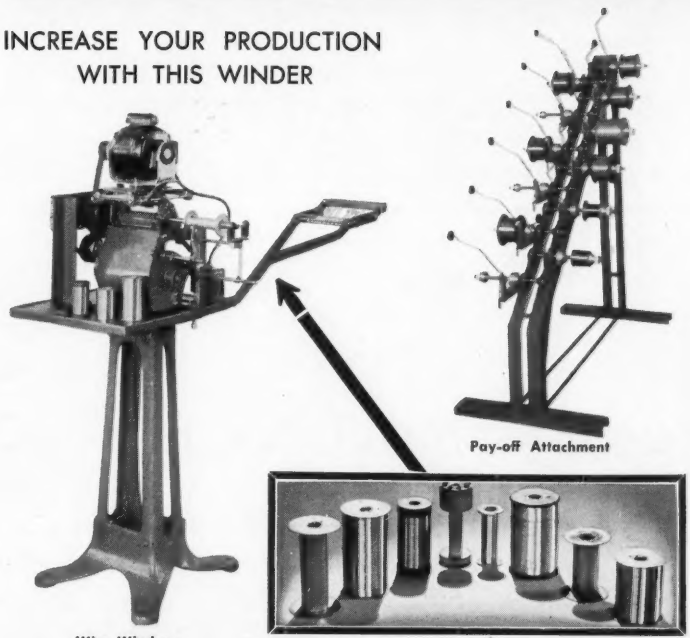
An entirely new line of low speed right-angle worm-gear motors has been placed in production by U. S. Motors. Introduced as Type GW Syncrogear, the design presents numerous exclusive features not heretofore available in low speed motors. Type GW incorporates a cantilever design to protect gear alignment. Mounting stresses are absorbed by a rugged single unit pyramidal base with "spread eagle" feet. The gear and motor housing are free from distortion. It embodies splash lubrication, a hardened and ground worm, leakproof oil seal and asbestos-protected windings. It has self-locking brake action. The parabolic contour of the motor housing gives the unit a pleasing appearance. This new motor is built in speed ranges from 20 to 155 rpm and gear ratios up to 58:1. Horsepower ranges from ¼ to 3. It is made in both 3-phase and single phase. The GW Syncrogear can be installed horizontally or upright and can be provided with a footless flange mounting. Other modifications provide variable speed, splashproof design and total enclosure.

★ ★ ★

For full details write to U. S. Electrical Motors Inc. and ask for Type GW Syncrogear Bulletin No. 1650. The address is P. O. Box 2058, Los Angeles 54, California.

STANDARD UNI-DRIVE WIRE WINDER.

INCREASE YOUR PRODUCTION WITH THIS WINDER



Wire Winder

Pay-off Attachment

Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

PAYOFF

Our payoff attachment is made with self - aligning ball bearings and a compensating attachment to control the tension of each end. Applies same tension when spool is empty as when full.

The new Uni-Drive Winder with Payoff Attachment is new in design and incorporates several improved and tested features. Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel—no over or under-winding. Automatic Stop-Motion controls each strand. Compensating attachment produces perfectly controlled tension. Traverse adjustable from 1⅝" to 5½" between spool heads without changing cam. Designed especially for winding wire to be braided and shielded for electrical conductors up to ¾" diameter. Payoff can be equipped with Carboloy Guide Inserts at additional cost.

STANDARD MILL SUPPLY
PAWTUCKET, R.I., 1064-1080 Main St.
NEW YORK, N.Y., 6708 Empire State Bldg.
CHARLOTTE, N. C., 2319 Hutchison Ave.

A Review of Recent Wire Patents

No. 2,595,332, WINDING MACHINE, patented May 6, 1952 by Penrose E. Chapman and Penrose Embree Chapman, Jr., St. Louis, Mo.; Emmiline T. Chapman administratrix of said Penrose Embree Chapman, Jr., deceased.

For winding a polygonal coil of wire, these inventions provide an assembly comprising a rotating jig about which the wire may be wound, a relaying sheave member movable lengthwise of the axis of the jig and from which the material may extend to the jig, a wire-engaging damping member between the relaying sheave member and jig and to one side of a plane between successive wire-engaging faces of this relaying sheave member and jig and over which the wire must pass from the sheave member to the jig, a carrier for at least one of the members, and a device for adjusting the carrier away from and towards the jig axis.

★ ★ ★

No. 2,595,729, ORGANOSILICON COMPOUNDS AND CONDUCTORS INSULATED THEREWITH, patented May 6, 1952 by Jack Swiss, Mckeesport, and Clyde E. Arntzen, Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania.

About the wire is an insulating coating comprising polymerized allyl-methyl silicon compound or interpolymer thereof.

★ ★ ★

No. 2,595,758, NEEDLE, patented May 6, 1952 by Charles E. Brown and Herbert M. Smith.

The needle is provided with a ready-threading eye.

★ ★ ★

No. 2,595,840, SPRING ASSEMBLY FOR UPHOLSTERY, patented May 6, 1952 by William W. Gleason, Chicago, Ill., assignor to Nachman Corporation, Chicago, Ill., a corporation of Illinois.

This assembly comprises a series of parallel rows of fabric encased helical wire springs, the ends of the casings and the terminal coils of the springs contained therein being connected by helical tie-wires encircling the ends of the casings and the spring end coils, a resilient frame composed of flat strip metal mounted upon one face of said assembly in overlapping relation to meeting end-coil portions of springs of a marginal row and an adjacent row and the casings thereof, and helical tie-wires encircling this frame and terminal portions of meeting points of certain of the casings and the terminal coils of two springs overlapped by the frame.

★ ★ ★

No. 2,595,920, DEGREASING MACHINE, patented May 6, 1952 by Otto J. Bratz, Adrian, Mich., assignor to American Chain & Cable Company, Inc., Bridgeport, Conn., a corporation of New York.

Included in this device are two inclined degreasing troughs draining into a solvent supply tank, a solvent heating tank supplying heated solvent to the degreasing troughs, a pump for pumping solvent from the supply tank to the heating tank and valve mechanism for controlling the delivery of heated solvent to the troughs one at a time and to either desired.

★ ★ ★

No. 2,596,263, GARMENT HANGER, patented May 13, 1952 by Walter Ludwig, Detroit, Mich., assignor to L. A. Young Spring & Wire Corporation, Detroit, Mich., a corporation of Michigan.

A central or hanger portion of the garment hanger is of twisted wire.

★ ★ ★

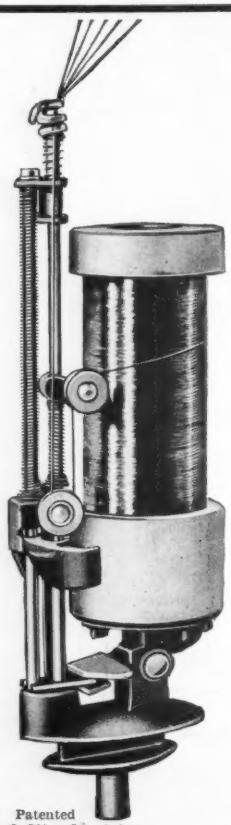
No. 2,597,222, ELECTRIC CABLE SYSTEM, patented May 20, 1952 by Charles E. Bennett, Ridgewood, N. J., assignor to The Okonite-Callender Cable Company, Incorporated, Paterson, N. J., a corporation of New Jersey.

This is an electric high tension conductor assembly for installation in a fluid-tight pipe line containing fluid insulation under superatmospheric pressure.

★ ★ ★

No. 2,597,762, CROSS CHAIN FOR TIRE CHAINS, patented May 20, 1952 by Henry St. Pierre, Worcester, Mass.

The cross chain comprises a series of connected twist links having opposite high and low sides at each end and bars secured to certain of the links and extending transversely thereof and of the chain, these bars lying parallel to the direction of motion of the chain when in



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2 BX - Special
MOSSPEED Carrier.

MOSSPEED BRAIDER CARRIERS
FOR BRAIDING
MULTIPLE ENDS OF FINE WIRES

A special design MOSSPEED CARRIER and BOBBIN is supplied for braiding "SHIELDED" WIRE, ETC.

Will braid multiple ends of aluminum, brass, bronze or copper wire, etc.

TWO SHEAVE- WHEELS and SPECIAL-TOP-THREADEYE on carrier, together with new type BOBBIN provides an even wire "let-off" resulting in a high quality and uniform braided shield.

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use, each bar having laterally and oppositely extending offset ends extending into the low sides of the links, the ends each presenting a relatively broad traction device lying parallel to the cross chain and transversely to the direction of motion of the chain.

★ ★ ★

No. 2,598,315, SUSPENDED TIE RACK, patented May 27, 1952 by Arthur D. Sweet, Los Angeles, Calif.

Twisted and bent wire of a single length provides the entire rack.

★ ★ ★

No. 2,598,537, APPARATUS FOR CONTINUOUSLY COILING ELONGATED FILAMENTS, patented May 27, 1952 by Estyle D. Hanson, Baltimore, Md., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

Here the apparatus comprises a rotatable drum, a device for guiding filamentary material to the drum, a number of devices carried by the drum for forming a number of coils of filamentary material upon the drum, means for effecting relative movement between the material-guiding device and the drum longitudinally of the drum to form a coil on the drum at each coil-forming device with portions of the material extending between the coils, and a cutter for severing the portions of the material between the coils.

★ ★ ★

No. 2,598,656, WIRE-POINTING MECHANISM, patented May 27, 1952 by Theron E. Bastian, Irondequoit, and Edward A. Strollis, Rochester, N. Y., assignors to Bastian Bros. Co., Rochester, N. Y., a corporation of New York.

This machine comprises a fixed bearing, a rotatable shaft movable endwise in this bearing and a tool-head mounted at one end of the shaft, oppositely arranged jaws pivotally mounted and movable transversely on the tool-head, a cam sleeve surrounding the shaft and held against longitudinal movement with the jaws having tail pieces engaging and controlled by the cam sleeve, cutters secured to the jaws having cutting edges which intersect in converging relationship when in cutting position thereby forming a point on a wire.

Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States and Canada $1.00. Address, Wire & Wire Products, 453 Main St., Stamford, Conn.

The Pittsburgh Regional Meeting

(*Continued from page* 671)

present site of the factory since 1828.

★ ★ ★

At present, production is at a peak of 60-million parts a day, and operations include an extensive wire drawing mill, and cold heading departments manufacturing large rivets, small rivets, tubular rivets, nails and rods. In addition, there are extensive facilities for performing such secondary operations as drilling, thread rolling and slotting.

★ ★ ★

Through the thoughtfulness of Firth-Sterling, Inc. the ladies who came to Pittsburgh with their husbands were entertained on Friday at a luncheon in the Pittsburgh Athletic Association's club house, after which they were taken on a tour of the Nationality Rooms of the University of Pittsburgh's Cathedral of Learning.

★ ★ ★

The trip to New Brighton concluded the program of the Pittsburgh Regional Meeting. There was a general and well-based feeling that it had been a most satisfactory affair. The chairman, Tom Girdler, and co-chairman, Ray Harmon, and their competent committeemen are credited with having done an outstandingly "swell job". They are to be congratulated and thanked for their hard work, which culminated in so successful a regional meeting.

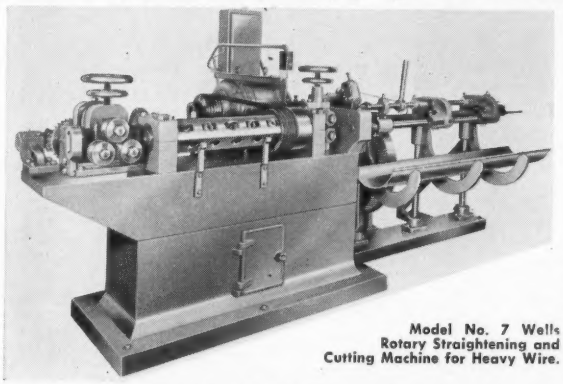
Symposium Mechanical Cleaning Of Rods And Wire

(*Continued from page* 675)

MODERATOR BALDRIDGE: I think it would.

FAST — DEPENDABLE
WELLS' STRAIGHTENER and CUTTER
For HEAVY Wire

The Model No. 7 illustrated is WELLS' ROTARY STRAIGHTENING AND CUTTING MACHINE for heavy gauge wire. It is designed to handle 1/4", 5/16", 3/8", 7/16" and 1/2" wire at speeds of 90' to 100' per minute on long continuous production runs.



Model No. 7 Wells Rotary Straightening and Cutting Machine for Heavy Wire.

The flier runs in ball bearings, and all wearing parts are made of tough steel castings to give a maximum of service, durability, and strength.

Other WELLS' MACHINES are made to handle smaller gauges of wire at speeds correspondingly higher.

Backed by 57 years of experience in making good straighteners and cutters, every WELLS' Machine may be depended upon to give long, steady and satisfactory service and will do tough jobs that many others will fall down on. The reason—good design, finest workmanship, best materials and experience.

Send today for Catalog No. 50 describing the full WELLS line.

Frank L. Wells Company

5821 FIFTH AVENUE

KENOSHA **WISCONSIN**

Builders of Fine Wire Making Machinery

A Member: Is that kind of operation being used commercially?

MODERATOR BALDRIDGE: I don't know.

A Member: It seems to me in advance of your descaling operation, it won't work harden, but put it over two drums with motors with slightly different speed, so you get a preliminary mechanical stretch, something like five per cent, and then take it through your descaling operation, that should be of definite help on your problem. I am just coming here to learn, thinking about it, finding out whether we want to jump into it or not.

A Member: Actually aren't we touching on the borderline of reactive wire drawing?

MODERATOR BALDRIDGE: I think so, yes.

A Member: On which, by the way, the Roebling boys should have some information. And certainly if they are scale breaking too, I would like to put the question up to them, has it been beneficial?

MODERATOR BALDRIDGE: Can you answer that question?

A Member: The only work we have done to date on descaler is in a two hole breakdown job on high carbon. And to be honest with you, we haven't been too successful. We use a two roll descaler, one horizontal plane and one vertical plane, and they are two inches in diameter. We process 187 rod and after going over those two rolls it looked pretty clean and then we go through an air blast to blow the rest of it off. I don't know whether that is worth the effort or not, but when it does get through there, as you say, we have 99 per cent of the scale off. But that isn't the problem; it is in the lubrication and in supplying a coat for the wire, and we haven't solved that yet for high carbon.

As far as back pull is concerned, last week we found some effect to that back tension on the property of the wire that was drawn. Of course we are drawing a raw rod, we don't have very good properties anyway, but that back tension, which is rather low, takes about 200 or 300 pounds to pull that rod through the descaler, that is about ten per cent of the —I would like to relate that back pull to the strength of the wire coming out of the first die, and that back pull is about ten per cent of the strength of that first die, and if your ratio is ten per cent, that is low back pull and we find even that low back pull affects the properties. Of course we don't care about that because it is just rip stock we are going to patent afterwards. But if we are processing a finished product and are not careful on how much back pull we put on, it is something to keep in mind.

A Member: You can put on as much as the machine will stand. The machine will stand more back pull than the physical specifications of the wire, isn't that right?

A Member: What do you mean by the machine? The wire machine?

A Member: You can pull through but you affect your physicals?

A Member: You had three rolls, didn't you?

A Member: Yes, we had three wheels and cut down to two to reduce our back pull.

A Member: Another thing, Hank, what proportion do you have on double deck?

A Member: We have a rough job, double bevel and double reductions, and our first job went pretty well but the coating we put on the wire just won't stand the gaff when we go through that second box, so we are licked there.

A Member: Didn't you say you got three times the life on the ripper die?

A Member: More than that, the ripper die is not the problem. If we had a pretty good coating that would take it I think we would be all right. If we lick this one then we might get by our other problem.

MODERATOR BALDRIDGE: That is interesting. Any other questions?

A Member: Has there been any work done on blasting that wire with sand of some kind after the scale breaker?

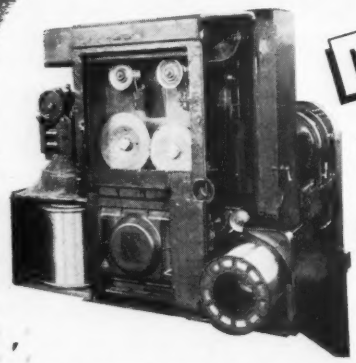
MODERATOR BALDRIDGE: We haven't done that. I understood somebody in the past tried that and it definitely affected the physical properties. Now that is just hearsay; perhaps someone else could answer. I have heard that has been tried. Have you?

MR. MILLER: Sol Kreisberg is sitting here and I think he would like to talk about that.

I think you had something to do with sand blasting a long time ago, and the physicals didn't hold up.

A Member: We took some scale off with sand blasting, but we didn't do anything in the way of drawing it.

A Member: I might mention about 25 years ago the first major step in drawing nickel-chrome resistance wire, AE-20, they pickled and would cover with flour and glue and alum, and it was an awful mess; you got something like bread dough on it, and it got by for one or two passes. The first major step in passing was salt annealing and water quench, and you could get four drafts using graphite as a lubricant. But you had an awful job pickling the graphite off. We got one or two passes with this bake coating and with the graphite you could get a fine finish and anneal, and keep on drawing with the graphite. In steel we had the



NOPCO'S
DURPON*
Drawing Compounds
give
2-TIMES MORE SERVICE
than
conventional compounds

Nopco's DURPON series of drawing compounds has been specially developed—after many years' research in the wire drawing field—for wet drawing nonferrous wire, rods, and tubes.

Incorporated into each Durpon product is a stabilizing additive which prevents contamination of the effective drawing ingredients by dirt, metallic particles, and carried-over acid. The additive preserves stability and lengthens the life of the drawing emulsion during recirculation. It also maintains a normal balance between soap and lubricant.

Nopco® Durpon compounds not only provide optimum lubrication, but retain their initial degree of performance for *twice as long* as conventional compounds. *Thus greatly increased die-life is assured.*

If you draw nonferrous materials —such as copper and copper coated rods and tubes—it will profit you to put one or more of these outstanding Durpon compounds to work for you *now*. You'll obtain better drawing results, and *reduce drawing costs considerably*.

We have immediately available:

DURPON
for intermediate gauge wire

DURPON L
for heavy wire, rods, and tubes

DURPON FW
for fine wire

Fill out and mail the coupon today. A technical bulletin and trial-size order will be sent promptly.

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EVOLVED THRU RESEARCH
NOPCO CHEMICAL COMPANY
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Gentlemen: Please send me a copy of your Bulletin giving information about Nopco DURPON Drawing Compounds.
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Company.....
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City.....Zone.....State.....

18 hole plates then, the boys used to wrap waste around so you could get a lubricating plug, and that worked the graphite on before it went to the die and you really made some nice wire.

A Member: Most of us using low carbon wire weld our coils together. How about the weld?

MODERATOR BALDRIDGE: We do it, that's all right. You can weld and that goes right on through. That has been the least of the problems we have run into.

A Member: I would like to say one thing about this rust situation. We had the same experience with high carbon; we accidentally got some rusty stock, and we weren't going to bother to draw it but, not having anything else at the time, we said, "Well, let's try it." It went quite well. You have to watch it, if you have too much rusting you get pitting and that is bad, but you can stand so much rust and we find when the scale comes off you have the rust right on the base metal; where it has rusted you get a brown coat as it comes through the die, where it hasn't rusted it is brighter. If you could do that uniformly you might have something.

MODERATOR BALDRIDGE: That is right.

A Member: There are two questions I would like to ask. One is for Hank. In putting wire around rolls in very severe bend, doesn't that have as much effect or more effect on the wire than back pull? We all know what effect it has in putting wire through a straightener, it changes the physical properties very much. So maybe putting the wire over rolls may have some effect on physical properties. Have you investigated that?

A Member: Yes, we did. It reduces its elongation a bit but so far as ductility there is nothing to worry about. A two inch roll does not make a severe bend.

A Member: Don't you have about a four inch or five inch bend going around there on your high carbon?

MODERATOR BALDRIDGE: Our experience is the same, torsion bends and everything else and we couldn't find it.

A Member: How about your union putting in a grievance for more pay and increasing your over-all costs?

MODERATOR BALDRIDGE: Anything that is new in a wire mill is no good, that's true. We have had more success putting a green man on the machines. But some of the oldtimers are beginning to accept it, and they make no trouble. They really are beginning to accept it. It was pretty rough for a while.

A Member: The usual result of putting in something new is that they want all the way from 50 per cent to 90 per cent of the saving.

MODERATOR BALDRIDGE: Quite true. We haven't had too much trouble, but we have had some.

A Member: You mentioned patented wire. Have you drawn much high carbon patented wire on your descaler?

MODERATOR BALDRIDGE: We are just getting into that, Chuck; we can't say yet. You mean spring wire and stuff like that?

A Member: I saw you drawing some at 1400 feet a minute and you were doing pretty good.

MODERATOR BALDRIDGE: I know, but it isn't a commercial thing yet. That's what we are doing right now.

CHAIRMAN HILL: Thank you, Bill, and all the members of the panel, and the audience.

Well, this brings this technical session to a close.

Drawing of Aluminum Wire

(*Continued from page 677*)

fers no problems that haven't already been experienced and rapidly solved by manufacturers using other metals.

Discussion of Mr. Urbanik's Paper.

A Member: On your 56-S alloy, how fine have you drawn it successfully in the production way, below .010?

MR. URBANIK: Yes, below .010.

A Member: How much further, two points lower?

MR. URBANIK: .008.

A Member: Is there much of a market for that, as far as Kaiser is concerned?

MR. URBANIK: I couldn't answer, I don't know.

A Member: Where is your anneal point when you are taking it down to .008?

MR. URBANIK: Down to .008 we would anneal at about .064 to .072, I would say around 14 or 13½ gauge.

A Member: Then you have to have a fairly inclusion-free rod, because your inclusions become greater in relation to the diameter as it goes finer, right?

MR. URBANIK: That is correct.

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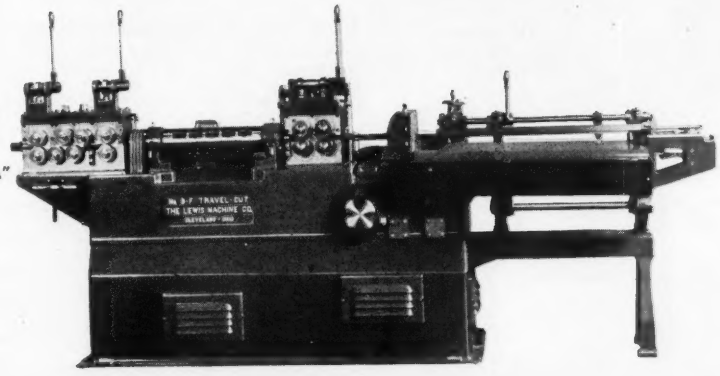

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The High Price in Principles of Price Control by Politicians

(*Continued from page* 685)

Even in the relative calm of last November when collective bargaining started between the theoretically free agents, union and management we were actually negotiating in a framework of government economic controls. There were wage controls, price controls, and profit controls imposed via the tax structure. And these in turn were all part of a declared national economic policy of stabilization.

★ ★ ★

As the long, involved hearings went on before the special panel of WSB, the industry pointed out that if the government insisted on violating its own wage controls, then it would have to unstabilize not only its price controls but also lose some of its own tax revenue, and thereby further encourage government deficit and more inflation. The industry did not and does not want a price increase except to compensate for any prior increase in wages.

★ ★ ★

As a matter of economics the industry could not absorb the WSB's full wage package even if it turned all of its declining profits into wages. Moreover, I think it is significant that the WSB so far violated the Government's stabilization policy and its own authority that Chairman Feinsinger had to start claiming "implied powers" even ahead of President Truman. His report contained the following bold but uneasy rationalization: ". . . . in either a voluntary or dispute case, the Board is free to take whatever action it deems to be fair and equitable and not unstabilizing, whether that involves merely an interpretation of its regulations, or requires an exception to or a general modification of such regulations."

★ ★ ★

It was apparently while in this illegal delirium that the Board decided it could also impose the Union Shop on the steel industry—certainly not an economic matter but very much a matter of violating people's private rights and freedoms.

★ ★ ★

Even without the WSB's Union Shop recommendation and the government's abortive seizure the right of free collective bargaining has also been badly bruised if not crippled by the government's abuse of its control powers. It is likely to disappear from now on every time the government enters a wage dispute—as witness the oil strike and the long—drawn-out impass in the seized railroads. It must be clear even to the unions that collective bargaining by forceful government intervention is only a step removed from complete government control not only of business but of labor, as well.

★ ★ ★

That there is such uneasiness on the part of thoughtful union people seems to be echoed in the words of **Mr. James P. Shields,** Grand Chief Engineer of the Brotherhood of Locomotive Engineers. When the Government recently got its own injuction against a strike against the railroads Mr. Shields declared:

"In light of the Cleveland rails decision (the injunction) and the seizure of the steel industry, this Nation now is faced with the specter of continued and expanded involuntary servitude unless present seizure tactics are wiped out on constitutional grounds. . . . If men's earnings, profits and collective bargaining, all can be placed in deep freeze without restrictive legislation we'd better know it as quickly as possible."

★ ★ ★

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The point of Mr. Shield's concern is not blunted by Judge Pine's temporary rescue of the Constitution from the endless temptation of politicians to dissolve away some of its authority and the people's rights under it. The Supreme Court or Congress may erect some permanent protection against "big seizures" of private property, but the process of "little seizures" goes on and on.

★ ★ ★

For nearly a generation now the inherited framework of our constitutional government, which is made all the more precious by the examples of its contrast with encroaching despotism on all sides, has been constantly infringed, abrogated or even suspended in part by little seizures in the form of "temporary" controls. The language of the Constitution has been superseded, first here and then there, by the alphabet of wave after wave of fiat bureaucratic government. And each wave has left a residue of temporary controls that have hardened into permanent infringements of our basic constitutional freedom.

★ ★ ★

There is no shortage of examples of this "creeping socialism" technique. The creep has been on since the depression developed as the first big "temporary" excuse for restraining controls on a constitutionally guaranteed type of free society. We did get rid of the NRA and the WPA, but look how much **more** we still have of the TVA, RFC and SEC, etc. The RFC seems to be tottering, but SEC has grown to the point where it wants to become a taxing authority in its own right.

★ ★ ★

Moreover, this endless sequence of "temporary" controls has been equally effective in interrupting or preventing the natural functioning of the **economic** laws of our free way of life, as well as its legal laws. On this point it bears repeating that the interference with or abrogation of our economic rights is the favorite approach of the socialist and totalitarian governments to the ultimate grabbing of a people's political and social rights. A halt is never called in time because each creeping encroachment never seems quite enough to justify a firm and united "last stand" against it. Especially since each grab is sold as a bill of beneficial goods to at least some of the people.

★ ★ ★

It is altogether probable, therefore, that if President Truman had not siezed the steel industry—with all the dramatic, vindictive, politically-calculated hullabaloo with which he went about it—thus compounding the abuses of Congressional and Constitutional authority involved—the whole "steel case" might have been pressured into settlement and life would have gone on as usual. Americans would simply have lost a little more of their freedom, but not many people would have been aware of it.

★ ★ ★

But now—finally and at long last—the people do seem to be aware of what is going on in this country under the guileless slogans of political opportunities and the expedient excuse of "temporary" control to meet fabricated emergencies.

★ ★ ★

The "nationalization of industry" and the "socialization of society" are vague terms when reflected across 3,000 miles of ocean from England. But suddenly we seem to have some bold clear samples right

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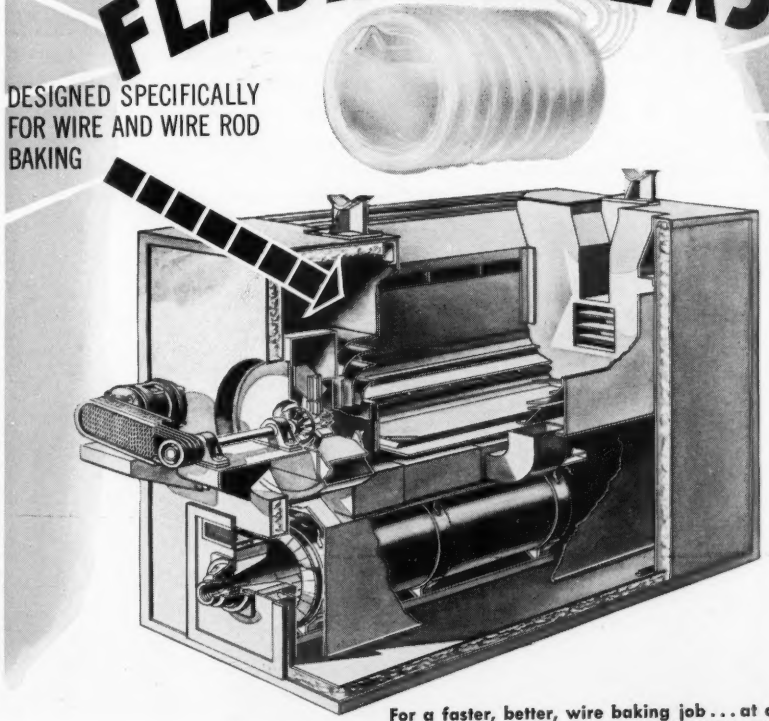

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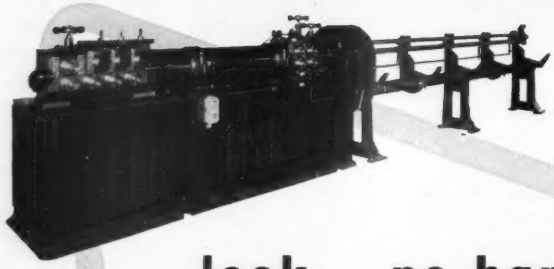

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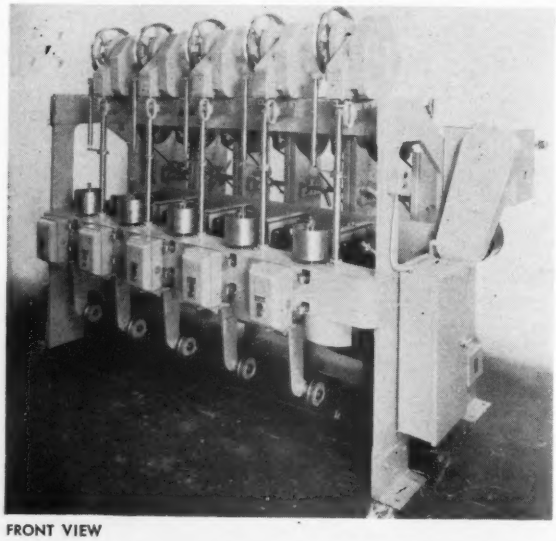
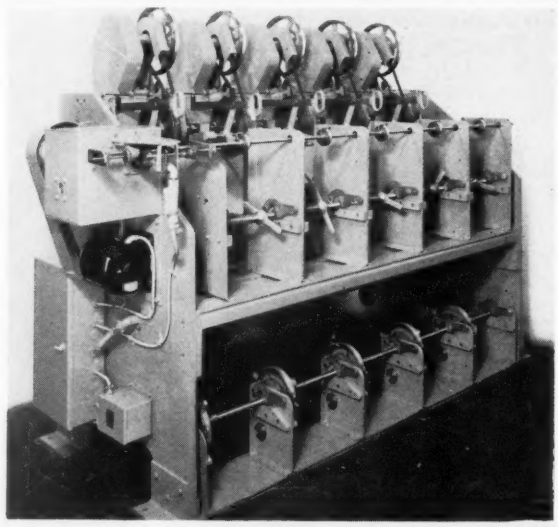


FRONT VIEW



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in the heart of America for all to see.

★ ★ ★

And to return to my original observation, apparently all Americans are taking a good look. They are also exercising their still-remaining American freedom to speak out about it. And I fully appreciate the opportunity to do so myself here tonight.

★ ★ ★

Being thus able to participate in this process, and seeing how widespread and unintimidated has been the chorus of protest against this crowning example of confiscation of freedom by economic control, I do not feel unduly discouraged. We have lost a lot of skirmishes in this subtle domestic campaign against our free way of life, and are right now in its biggest battle. If enough of us are rearoused to think and speak and act and vote for our convictions, who knows we may again prove that the price of freedom is eternal vigilance—and that such vigilance is the one sure way to keep our freedom.

★ ★ ★

Instant Safety Cutoff In New Mining Machine Cable

A new portable mining machine cable which reduces the chance of shock hazard and arcing when a break occurs, has just been developed for **Anaconda Wire & Cable Company** by **C. B. Peck**, manager, **Portable Cable Sales**, after consultation with **E. O. Jackson**, gen. supt. and **George K. Burnhart**, master mechanic of **Independent Coal & Coke Company**. The new cable has successfully passed trials in the field.

★ ★ ★

The purpose of this cable design is to cut off the power the instant damage occurs to the positive conductor insulation. The cable is used in conjunction with a ground trip relay which, when energized, shuts the power off. It is especially adaptable for use with shuttle cars and other mobile mining machines.

★ ★ ★

In addition to its safety features, the cable meets all the requirements of the Federal Mine Safety Code, Schedule 2E of the U. S. Bureau of Mines, and Act #206 of the Commonwealth of Pennsylvania.

Refined Copper Holdings

The Copper Division of the National Production Authority is advising domestic holders of refined copper who are in doubt whether such copper can be converted for their use that arrangements can be made for its conversion.

★ ★ ★

Those in physical possession of the metal may apply to the Copper Division for necessary permission to convert it into CMP forms and shapes.

★ ★ ★

When making application it will be necessary to furnish information specified in paragraph "C" of section #6, NPA Order M-16, NPA said prompt attention will be given to these applications.

The Annual Convention

This will be held in Cleveland this year, November 10-14, with headquarters at the Carter Hotel. Please note the change from October to November; full details to be announced later.

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Complete and compact — that's NRM's 1" Bench Type NYLON Wire Covering Unit. Electrically heated, this unit is especially designed for the covering of small diameter (magnet) wire quickly and accurately with NYLON. It's also ideally suited to the pilot production of experimental NYLON compounds. Wire covering speeds range up to 1600 feet per minute for wire from No. 24 to No. 36 B & S gauge.

This Bench Model actually is a production unit in miniature and possesses virtually all of the exclusive features of NRM's larger extruders. Temperature control is accurate; the feed screw is especially designed for truly efficient extrusions; the cross-head and die are directly mounted for controlled heating; the supply and take-up equipment is fully synchronized; construction is exact and sturdy throughout.

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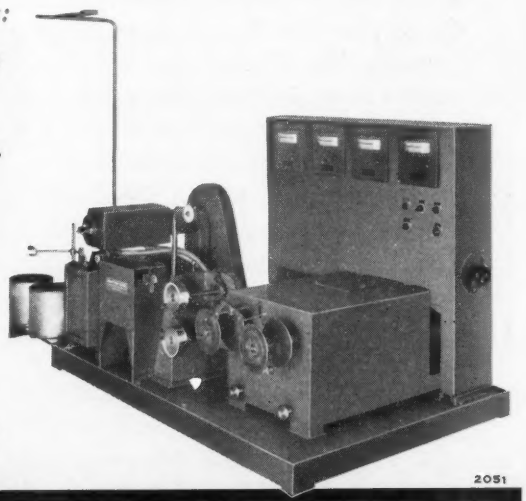

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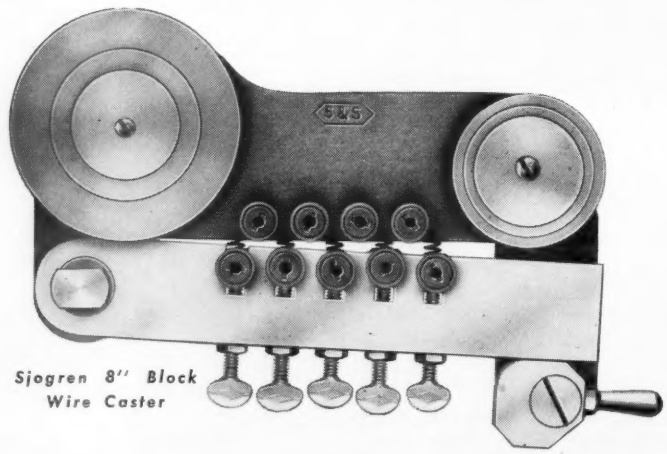

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Metal Carbides to Start Large Expansion

Metal Carbides Corporation, Youngstown, Ohio, announces that it will commence construction in the near future of a $1,000,000 plant on a 17-acre site located at Mathews Road and Southern Blvd., Boardman, Ohio, a suburb of Youngstown. The new facility will have a monthly capacity of approximately 25,000 lbs. of Tungsten Carbide Metal, Tungsten Alloy Heavy-Metal, Titanium Metal and other special alloys made from powdered metals. Certificates of Necessity have been granted the company by the Defense Production Administration to construct the above facility.

★ ★ ★

The main plant of the company at 107 East Indianola Avenue will be continued in operation, producing a full line of Tungsten Carbide cutting tools, drawing dies, rolling mill rolls, diamond products and machine tool attachments. The productive facilities of this plant have been more than doubled during the past two years with another 10,000 sq. ft. of floor space having been recently added, making total factory space at the present plant over 50,000 sq. ft. The demand for the company's products has been increasing each year with tungsten carbide tools, dies and wear-resistant parts being in great demand by the metal working industry. It would be impossible to draw, machine or form many of today's new alloys and metals without tungsten carbide metal.

Bulletin on Mobile Crane and Trailer

SILENT HOIST & CRANE CO., pioneer manufacturers of the self-propelled, rubber tired KRANE KAR mobile Swing-Boom Crane, have now broadened the usefulness of this materials handling equipment with the development of the KRANE KAR TRAILER TRANSPORT. The mobile crane has been integrally linked with a trailer. The dual-purpose equipment therefore provides a Mobile Crane for lifting, stacking, spotting and loading applications; and a Transporter for carying and delivering bulky, heavy or large quantities of varied materials in yard or shops.

★ ★ ★

Of special importance is the fact that the mobile crane, for the very first time, provides DUAL SEATS and DUAL OPERATOR CONTROLS, so that the unit may be operated in congested areas or narrow aisles **without turning the machine around.** Operator simply performs his chores from one seat; then simply shifts over to the opposite seat, and travels to destination. Time and labor-saving. Illustrations and description of KRANE KAR Trailer Transport are available in new BULLETIN No. 80 which will be sent on request. Write to 841 63rd St., Brooklyn 20, N.Y.

Mechanical Properties of Nickel Deposits

A 12 page booklet with 13 charts, 3 tables and numerous photo-micrographs that show the wide range of properties that may be obtained in electro-deposited nickel by varying the solution and plating procedure. The design engineer will find data on the interrelation of ductility, strength and hardness in deposits that may be obtained in present-day rapid nickel plating solutions. The plater will find data that will help him meet the specifications of the design engineer. **International Nickel,** Dept. EZ, New York 5, N. Y.

ANNOUNCING . . . A NEW BOOK

"STEEL WIRE IN AMERICA"

by

Kenneth B. Lewis, Wire Mill Consulting Engineer

This new book is primarily the story of the third great revolution in wire technology—the one that occurred between the two world wars. A brief history of each of the two preceding revolutions is given to provide a background for an understanding of the changes that occurred in the period under discussion.

In his treatment of the subject, the author has sifted out the causes and consequences of the changes that have taken place and has assigned credit to men and companies for their respective achievements.

"Steel Wire in America" covers the whole gamut of wire processing, from the rolling of rods through its significant phases that lead to the fabrication of finished wire products.

The book was sponsored by The Wire Association and 25 concerns in the industry placed advance orders for a total of 500 copies to make possible its publication. As the edition is limited to 1000 copies, orders will be taken up to the limit of the remaining 500 copies. The price is $15.00.

Order your copy from

BOOK DEPT., WIRE AND WIRE PRODUCTS

453 Main Street **Stamford, Conn.**

Exhibition Stand Suspended by Ropes

Generally conceded to be the most spectacular stand at the British Industries Fair in Birmingham, England, this year is the display of **British Ropes, Ltd.**, the office of which is slung in the air and suspended by 9/16″ dia. rigging ropes.

★ ★ ★

This is the first time an exhibition stand has been slung in this manner. Even the stairway leading to the upper structure is entirely free of the ground. The illustration shows the suspended office.

★ ★ ★

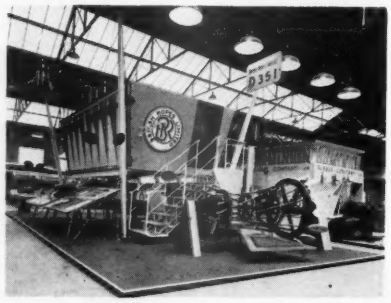
The four suspension ropes (at each corner) are 9/16″ dia., 7 x 7 construction galvanized quality, 100/110 tons per sq. inch tensile strength. These are more than adequate for the load to be carried but a compromise had to be struck. We did not want to over rope the job but we did not want the suspenders to be so small that they were not immediately recognizable as ropes.

★ ★ ★

The steadying ropes from the bottom of the office were ⅜″ dia. 7 x 7 construction, 95/105 tons per sq. inch tensile and the pylon guy ropes were of ½″ dia. 7 x 7 construction, 95/105 tons per sq. inch tensile.

★ ★ ★

Hand tightening of the rigging screws on each rope was sufficient to ensure complete rigidity of the



British Ropes, Ltd. Booth at British Industries Fair, Birmingham, England. * * *

whole structure so that it was not even necessary to fix the stairs to the platform as was feared at the planning stage.

★ ★ ★

So successful has the whole conception been as an exhibit that the display has become one of the features to which distinguished visitors are taken.

Bulletin on High-Speed Automatic Gaging and Sorting

A 20-page bulletin issued by **Federal Products Corp.**, 1144 Eddy St., Providence 1, R. I., illustrates the various types of Automatic Gaging Methods and Gages designed and built by FEDERAL. This also includes Continuous Measuring Gages.

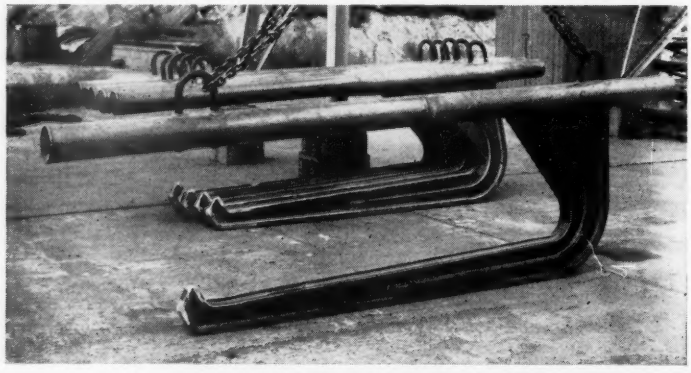
★ ★ ★

All of these employ electro-mechanical and electronic systems for obtaining the desired results. They differ from the straight electrical sorting gages in that the electronic system enables parts to be sorted into numerous categories according to customers' requirements.

★ ★ ★

Copies will be sent to interested persons.

Hairpins
THAT LIFT TWO TONS



WELDCO lightweight **hairpin hooks cut pickling costs . . . resist corrosion . . . last longer**

These hairpin pickling hooks, recently shipped to a leading Eastern wire mill, measure 14 feet in length, and each can handle 4200 pounds of coiled steel products at a time. Lightweight and unusually strong, the Weldco hooks are made of heavy, corrosion-resistant Monel plate. The spreader bars are of steel tubing, Monel-sheathed for maximum protection against strong pickling acids and fumes, and to keep scale or rust from falling onto the coil being processed.

Many wire mills throughout the country use Weldco hairpin hooks because of their excellent service record. Why not find out how these new, improved high-strength hooks can cut your costs? A phone call or letter will bring you complete information.

THE YOUNGSTOWN WELDING & ENGINEERING COMPANY
OAKWOOD AVE. . . . . YOUNGSTOWN, OHIO

Gaging for Profit

Federal Products Corporation, Providence, Rhode Island, announces a new 16mm film of the above title showing practically all known modern methods of gaging for the control of dimensional accuracy.

★ ★ ★

These include—Mechanical types or dial indicators and dial gages; electro-mechanical, ("Electricator"); air, ("Dimensionair"); automatic sorting gages and continuous measuring gages.

★ ★ ★

Scenes show typical gages in use. Over 4,000 miles were covered in obtaining views in customers' plants.

★ ★ ★

The value of indicating gages in statistical quality control is briefly demonstrated with a short outline of Federal's educational work in quality control.

★ ★ ★

A new indicating snap gage is demonstrated as well as the higher degree of accuracy obtained with an indicating micrometer.

★ ★ ★

Gages for continuously measuring bare and insulated wire, strip material such as steel, rubber and others are shown. Also, a gage which automatically controls machines so as to maintain finished material to specified sizes.

★ ★ ★

Multiple dimension gages and automatic sorting gages are shown sorting into up to 20 categories all sorts of pieces from small steel balls of only 1/64" diameter; rivets (3 dimensions); refrigerator pistons and pins (diameter); fountain pens (length & diameter); ceramic tubing (diameter); spark plugs (length) etc., etc.

★ ★ ★

The new Federal "Dimensionair" air gage and its range, calibration and accuracy stability is demonstrated in all details and on grinding and honing operations.

★ ★ ★

The film will be loaned for one and two-day showings without charge to interested manufacturers by request to **Federal Products Corporation,** 1144 Eddy Street, Providence 1, Rhode Island. All that is required is viewer prepaying express charges when returning film.

THE Announcing!

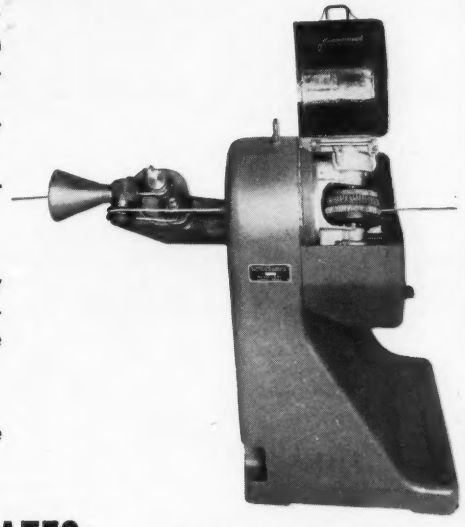
LINÉ-GORCY MECHANICAL ROD DESCALER

The *only* DESCALER which embodies both of these essential cleaning steps:

a) scale-breaking over sheaves at 90°
b) wire-brushing in tangential opposition.

The *only* DESCALER now available for prompt delivery to American Wire Mills.

Quotations and Descriptive Data on request.



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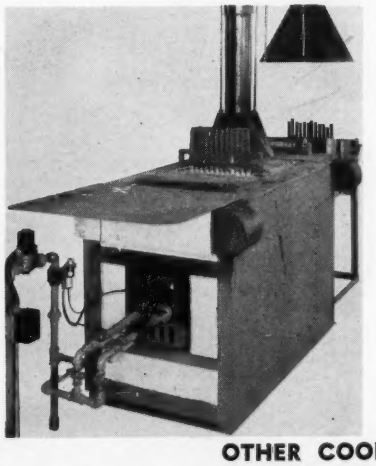
12-Head High Speed Tinner

PAY-OFF • FLUX POT • TIN POT • TAKE-UP



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HANDLES WIRE FROM B. & S. No. 24 THRU B. & S. No. 36

Efficient • Dependable

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J. GERBER & CO., INC.
855 Avenue of Americas
NEW YORK 1, N. Y.

Joseph W. Mullally

Joseph W. Mullally, Manager of Utility Sales for Anaconda Wire & Cable Co. of New York, died on June 10th in Washington, D. C. at the age of 54.

★ ★ ★

Mr. Mullally was born on December 5, 1897, in St. Louis, Mo.

★ ★ ★

He joined the Anaconda Wire & Cable Co. in 1930. From November of that year to July 1938 he was District Manager in Pittsburgh for the company. During World War II, between 1942 and 1945, he was chief of the Wire Mill branch of the Copper Division of the WPB. In March 1951, he became a consultant in the Copper Division of the NPA. In May of the same year he was made Deputy Director of the Division. He returned to the Anaconda Wire & Cable Co. in December 1951, as Manager of Utility Sales.

New Pump To Remove Molten Metals and Salts from Tanks

A pump for handling zinc, other molten metals and salts was exhibited at the Regional Meeting of the Wire Association in Pittsburgh by Richard J. Seymour of the Wire Equipment Manufacturing Company, Inc. It is known as the WEMCO FAST-FLO METAL PUMP.

★ ★ ★

Designed to quickly drain galvanizing or heat treating pans at the first indication of a leak, the pump allows the immediate shut-down of all burners without danger of solidification before the pan is emptied, thus minimizing the damage to the pan lining from the "hot spot". Costly down-time due to slow hand ladling and extensive repairs is eliminated and metal loss during the "down"period is minimized.

★ ★ ★

Zinc, lead, tin and heat-treating salt up to 1250°F. have been successfully pumped and tests are in progress on aluminum at 1450°F. and above.

★ ★ ★

The pump is powered by a 3 H.P. air motor operating on 80 to 90 PSI pressure and consuming 90 CFM at full capacity. The use of an

And here's why . . .

Mason spools save you money because they meet all your requirements—yet cost you less!

It's as simple as that! Mason's integrated production facilities keep costs down—and the savings are passed on to you. Mason's own coating and lithographing department offers you faster service.

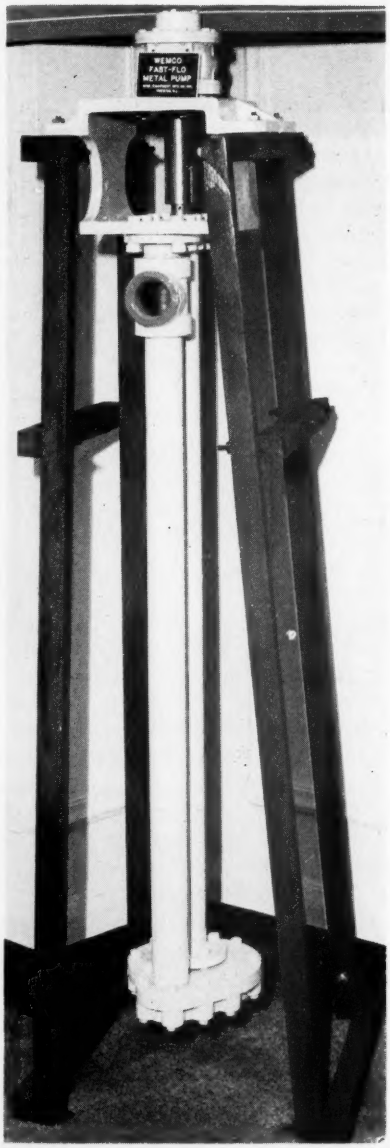
Take advantage of Mason's high-quality — low-price policy now.

Write for further information or for a specific quotation.

MASON CAN COMPANY
1949 Dexter Rd., East Providence 14, R. I.
MASON CAN COMPANY OF OHIO
Greenville, Ohio

air motor eliminates all the maintenance difficulties encountered with an electric motor in this application. The air motor is unaffected by heat and will operate with locked rotor indefinitely without harm.

★ ★ ★



Wemco Fast-Flo Metal Pump.

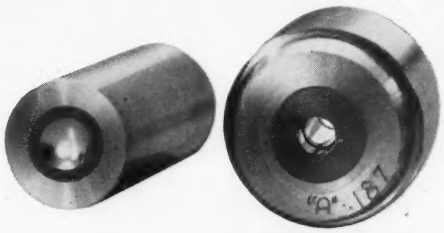
Handling of the pumped material, if no empty pan is available, can easily be accomplished by pumping into non-returnable steel barrels which can be stripped off with a cutting torch after the metal cools. By freezing a hook or shackle into the metal, this ingot can be easily handled with a crane.

★ ★ ★

SAVE

MAN HOURS DIAMONDS AND TUNGSTEN-CARBIDE with HYPREZ "OS" DIAMOND COMPOUNDS

- Hyprez "OS" is self-lubricating, will not fly off work or tool, absorbs more abraded material—has long-lasting cutting action.
- "OS" diamond particles are precision graded, uniformly distributed, permanently suspended.
- "OS", like "Type W", is available in color-identified 18 or 5 gram cartridges for Hyprez Applicator Gun; also in jars.

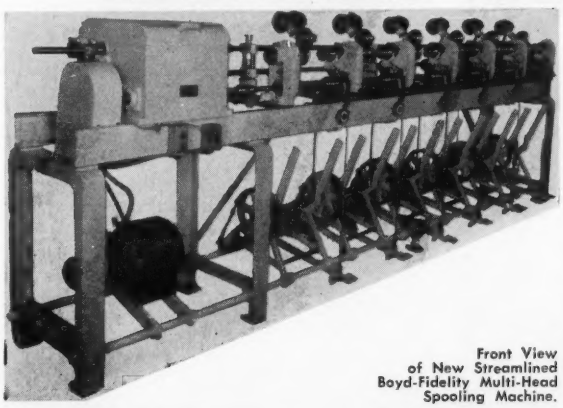


Cold Heading Dies and Punches, as well as Drawing Dies, are finished faster with Hyprez "OS".

Write for Complete Information or Free Demonstration to Dept. W-752

HYPREZ DIVISION
ENGIS EQUIPMENT CO.
431 South Dearborn St. • Chicago 5, Ill.

A New and Improved . . . .
MULTI-HEAD SPOOLER



Front View of New Streamlined Boyd-Fidelity Multi-Head Spooling Machine.

This six-head spooler has a common traverse for all spindles. Each spindle is started independently by manual control and stopped automatically by a predetermined footage counter through a solonoid released clutch. The rate of traverse for different wire sizes is governed by easily changed gears. All parts precision made.

Will wind wire on spools up to 10" in diam. and traverse of ½" to 8". Furnished also to wind on wider spools, if desired, and with one to twelve spindles. Counter stop-motion, wire compensators and wire straighteners are optional equipment. Anti-friction bearings. Spindle speeds up to 1200 R.P.M. possible.

Send for full details.

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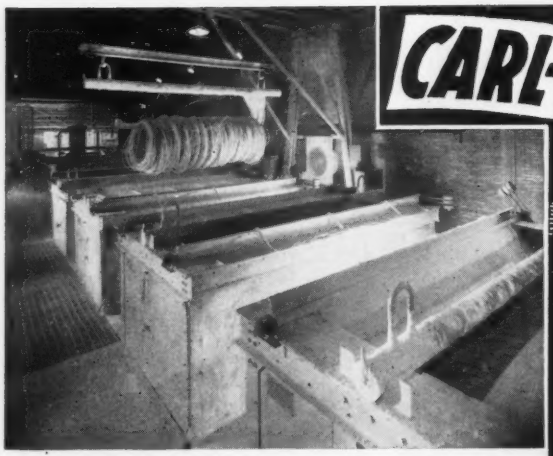

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GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy — and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350.*

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Eaton Manufacturing Co.
Frost Steel & Wire Co., Ltd.
B. Greening Wire Co., Ltd.
Gary Screw & Bolt Division of Pittsburgh Screw & Bolt Corp.
Hollup Corp.
Indiana Steel & Wire Co.
Johnson & Nephew, Ltd.
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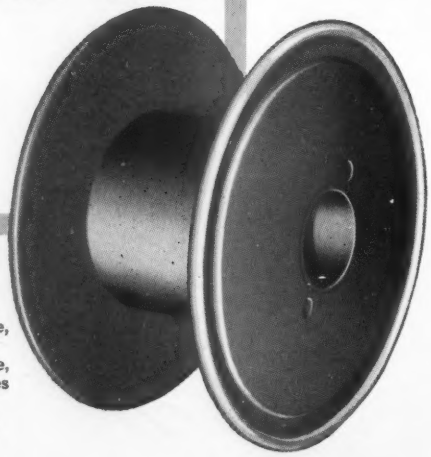
THE CARL-MAYER CORPORATION

3030 EUCLID AVENUE
CLEVELAND, OHIO

What's your problem with...

SPOOLS
REELS
BOBBINS?



Get in touch with Apco Mossberg. We are familiar with the production problems involving steel spools, reels and bobbins, utilized in the copper wire, steel wire and wire rope industries. Profit from our half-century of experience, engineering know-how and plant facilities —making possible the manufacture of almost any conceivable kind, type, size and quantity of steel spools, reels and bobbins. Contact us for free engineering service. Without obligation we will be glad to offer suggestions and solutions to your particular problems.

Write TODAY for a copy of our booklet that illustrates:

- *Flat Head Spools*
- *Curled Flange Spools*
- *Stranding Reels*
- *Take off Reels*
- *High Speed Wire Drawing Reels*
- *Vulcanizing and Insulating Reels*
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Canadian Representative
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47 Colborne Street, West
Toronto, Ontario, Canada

The capacity of the pump in zinc, at full throttle, is 360,000 lbs./hour. Other metals are discharged at a rate proportional to their viscosity and density. Use of corrosive resistant, high strength materials throughout and the careful selection of bearing materials gives long maintenance-free service.

★ ★ ★

The pump is arranged to be either hung from a crane or permanently mounted and suggested layout drawings are available from the manufacturer upon request. Discharge is through a 2″ pipe. The standard pump is arranged to strip a pan 48″ deep. Special lifts for deeper pans can be supplied on order. The design of the intake and impeller enables the pan to be almost completely emptied.

★ ★ ★

Further details can be obtained from the Wire Equipment Manufacturing Company, Inc., 1100 South Broad Street, Trenton 10, N. J.

Chemical Stabilizer Announced

A new chemical stabilizer, which makes possible the production of an improved type of non-staining and non-discoloring GR-S synthetic rubber, has been developed by **Naugatuck Chemical Division, United States Rubber Company.**

★ ★ ★

The new chemical, known as Polygard, will find use in wire insulation and all rubber products where light colors are desired.

★ ★ ★

The required usage of large amounts of GR-S synthetic in all types of rubber products, the lower cost of GR-S compared to natural rubber, and the recent lifting of the ban on the manufacture of white sidewall tires, has resulted in a large present and potential demand for the non-staining grades of GR-S synthetic. The new chemical stabilizer is said to make possible significant improvements in the quality of these types of rubber.

Eastern Brass and Copper Expands

Exterior work has been completed on the new one-story unit abutting the present two-story structure which houses the **Eastern Brass & Copper Co.**, at 1122 East 180 Street, Bronx, New York. The unit adds

17,000 square feet to Eastern's present floor space and includes truck bays and loading platforms to facilitate loading and unloading.

★ ★ ★

An overhead track has been installed to carry an electric crane system of five-ton capacity throughout the building. Designed expressly to meet Eastern's increasing activity in the steel warehousing and processing field, the unit will contain new processing machinery as well.

★ ★ ★

Eastern is a major processor of metals in the New York, New Jersey, and New England areas, and their expansion program will help meet the need for increased facilities faced by manufacturers doing defense production work, as well as by other metal fabricators.

Michigan Oven Moving Offices

In order to facilitate the handling of its increased business, the **Michigan Oven Co.**, Detroit, Mich., is moving its offices to new and larger quarters. On and after June 1st the company's offices will occupy the entire 6th floor of the Architects Building, 415 Brainard St., Detroit, Michigan.

Announce New Crystal Orientation Table

A new, improved quartz crystal orientation table (type 52190) that is highly versatile and adapted for numerous and varied measurements has been announced by the **Research & Control Instruments Division, North American Philips Company, Inc.,** 750 South Fulton Avenue, Mount Vernon, N. Y.

★ ★ ★

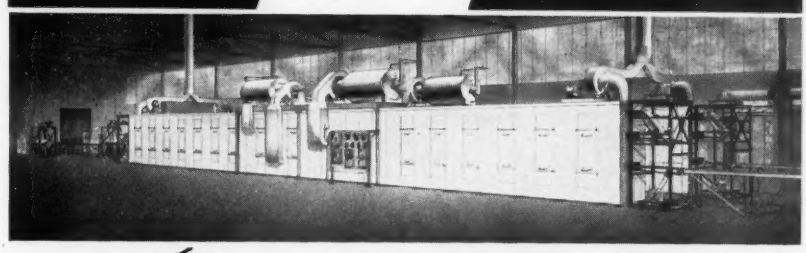
The head of the unit has multiple x-ray slots to measure pieces of quartz of varying heights, the bar and section holder having a matching height adjustment. The reference guide may be placed on either the right or left side of the table, which may be used to check angles in mother quartz, sections, bars, wafers, blanks, and test cuts.

★ ★ ★

Unmounted pieces of quartz are measured by placing them against the head and holding them in place with the bar and section holder. All axes, X, Y and Z, may be accurately

CARL-MAYER WELDING ROD OVENS

PATENT NOS. 1,843,430 2,373,325



One of Several Carl-Mayer Ovens at Hollup Corp.

FAST, EFFICIENT AND ECONOMICAL DRYING OF COATED WELDING RODS.

Only in Carl-Mayer Ovens can you obtain the combination of the recirculating gas fired air heater principle and the "Mayer" patented rod transfer system — two highly important features in ovens of this type.

We also build other types of industrial ovens and furnaces. Carl-Mayer installations are backed by reputation for unusual performance, and over 30 years' experience.

WRITE FOR BULLETIN NO. 350

THE CARL-MAYER CORPORATION

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CLEVELAND, OHIO

NORBIDE® Abrasive: *Effective, Economical*

NORBIDE Abrasive, made of Norton Boron Carbide, is second only to the diamond in hardness — *but 150 times less expensive!* It will effectively cut and semi-finish wire drawing dies, particularly those made of the hard cemented carbides.

Write for Catalog No. 559-W

NORTON COMPANY
Worcester 6, Mass.

NORTON *Making better products to make other products better*

THE LACQUER INSIDE MAKES THE DIFFERENCE

Most drums of lacquer look pretty much alike — from the *outside!*

But the lacquer inside can vary a great deal in its ability to meet your cable coating requirements. Only a lacquer that is expertly formulated with your own end use in mind can give *completely* satisfactory performance.

When you specify *New England* lacquer, you can be sure that each drum contains the *right* cable coating for your requirements. That's because it has been formulated specifically for you by experienced insulated wire specialists.

The above photograph is one of many contained in an eight-page brochure describing our facilities to serve you. Write for your copy of the complete brochure!

NEW ENGLAND LACQUER CO.
150 KING PHILIP ROAD
EAST PROVIDENCE, R. I.

determined and the various cuts can be located and measured on the goniometer scale. Similarly, test cuts are placed against the head for measurement and deviation is read in the same manner.

★ ★ ★

Mounted pieces of quartz are measured by placing the reference edge of the mount against the reference guide on the side of the table. The specimen is brought up to the stop and after reading the deviation, the mounted pieces are taken to the saws where correction is made to saw table adjustments. In this work, the head, bar and section holder are removed.

Austrian Insulated-Wire Team Here Seeking Production Information

Austria, which today must import large quantities of wire products, has sent a productivity team to the United States to observe this country's insulated wire and cable manufacturing methods.

★ ★ ★

The 14-man group, representing Austrian firms producing wiring, cable and conduits for the electrical, telephone and radio industries, arrived in New York City May 14 for a five-week plant tour sponsored by the Mutual Security Agency under its productivity and technical assistance program.

★ ★ ★

The representatives of management, labor and technical operations will study modern techniques of drawing wire, application of protective coatings to raw wire by tinning or varnishing, insulation of wire with asbestos, rubber or plastic, assembly of wires into cables and conduits, and the addition of various outside protective coatings. They also will obtain information on plant management, labor relations, production scheduling, routing, testing, materials handling, and process engineering.

★ ★ ★

Upon their return to Austria, team members will submit a technical report which will appear in publications edited by the Austrian Productivity Center. Increased productivity in the insulated wire and

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ROOS-
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is Ready

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STANNOUS SULFATE

Saves Tin!

in liquor finishing operations

because

M & T Stannous Sulfate — a manufactured chemical — saves tin by doing away with many of the inefficiencies which accompany the treating of feather or flake tin to produce stannous sulfate on the job.

More convenient to use, too!

Baths are operable as soon as materials are dissolved. Solutions can be prepared in advance to produce desired colors and coating thicknesses.

AND, additions are made from stock solutions, assuring quick, complete mixing—eliminating any possibility of materials only partially dissolving in the bath—reducing the chances of miscalculating quantities of materials added.

Use M & T Stannous Sulfate for white or straw-color finishes. Write for technical procedure sheet.

METAL & THERMIT CORPORATION
Chemical Division
100 E. 42nd St., New York 17, N. Y.
Specialists in Tin and Tin Chemicals

cable industry is the main objective of the groups' American tour. Firms represented by the team have announced that profitable operational improvements resulting from the trip will be reflected in higher wages and lower prices.

Quality Consciousness a Matter of Education

Getting employees "quality minded" through a unique "communications" program has resulted in large dollar savings for the **Anaconda Wire & Cable Co., H. E. Thompson,** Quality Control Manager, recently told a forum at the 6th Annual Convention of the American Society for Quality Control, in Syracuse, N. Y. He called the success of the program one of the most important factors in achieving "Improved Quality."

★ ★ ★

"Whether you use 'Statistical Quality Control'," Mr. Thompson stated, "or any other technique designed to improve quality, the whole thing can fail if the real desire to improve quality is missing.

★ ★ ★

Anaconda, he declared, has set up its successful program to keep employee's "quality minded" by establishing a continuous flow of information about the company, its policies, and its problems.

★ ★ ★

Through supervisors, bulletin boards, displays, contests, letters to employees homes, a suggestion system and other "communications" methods, the firm makes employees "quality conscious" by first defining what are its quality standards, and by next showing employes specifically how to get and maintain "Improved Quality."

R. B. & W. Adds to Sales Staff

Russell, Burdsall & Ward Bolt & Nut Co. has added new sales executives to the Pittsburgh area. They are **Richard D. Baker,** appointed resident vice president, and **Thomas Toby** as assistant manager of sales. **Alfred J. Fairfield** has retired from his positions as sales manager at the company's plant in Coraopolis, Pa., and as Detroit sales manager.

BORAX

COATS STEEL RODS WITH JUST

ONE DIP!

Check The Advantages Borax Offers:

√ **BETTER WORKING CONDITIONS**
Borax is clean, dust-free, nonflaking

√ **FASTER BUTT WELDING**
Borax is a natural flux—butts are ready

√ **FASTER ACID NEUTRALIZING**
Borax is an effective mild alkali

√ **LONGER STORAGE SAFETY**
Borax is protection against rust

√ **SPEEDIER PRODUCTION**
Borax film is tight, pliable, nonflaking

√ **LONGER DIE LIFE**
Borax is an excellent lubricant carrier

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DIVISION OF BORAX CONSOLIDATED, LIMITED
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MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS

DIAMOND DIES
Master-Made by PHILIPS

Of all the diamonds mined, less than .4% meet PHILIPS' high quality requirements such as purity, structure, and shape.

Master craftsmen transform them into dies in the world's largest, most modern diamond die factory. Drilled to precision tolerances, these are available to American industry under the NORELCO trade name.

NORTH AMERICAN PHILIPS CO., INC.
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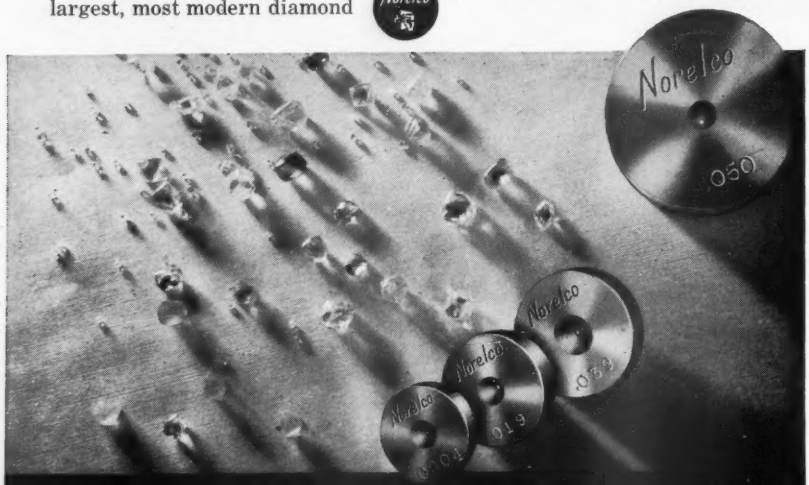

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OVER 150 Years OF COMBINED OVEN ENGINEERING EXPERIENCE

ANNEALING AND ENAMELING . . . OVENS . . . *DESIGNED TO FIT THE JOB*

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WHEN you have an annealing or enameling problem, take advantage of our engineering staff's long and specialized experience in the designing of ovens for leaders in industry throughout the nation. If you will tell us your requirements, we shall be pleased to give you our recommendation.

Write for Brochure: "Your Oven Problems"

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Representatives In Principal Industrial Areas

MICHIGAN OVEN COMPANY
425 Brainard Street, Detroit 1, Mich.

Hooker Plans Plant Expansion

Hooker Electrochemical Company, Niagara Falls, one of the largest producers of chlorine, caustic soda and diversified chlorinated organic chemicals, has completed negotiations for a 25-year loan in the amount of $20,000,000, a company announcement states.

★ ★ ★

Hooker's present expansion program calls for an expenditure of $25,000,000 in the years 1952-53, the announcement said. This will include a $10,000,000 caustic and chlorine plant to be erected at Montague, Michigan; a substantial further expansion of caustic and chlorine capacity at the Tacoma plant; expansion in capacity of many diversified chemicals at Niagara; and additional facilities and plant improvements to further reduce costs, improve efficiency and quality.

★ ★ ★

By the end of 1953, the announcement added, Hooker's gross plant and equipment value will approximate $58,000,000, or four times the $14,500,000 value at the end of 1945.

Specialty Wire Company Moves

The Specialty Wire Company, Inc. has moved its plant and offices into new and larger quarters at 110 Grove Street, Worcester 5, Mass.

★ ★ ★

This has been necessitated by the growing demands on them and whereas the company formerly specialized in fine sizes of stainless steel wire, it will now also produce music spring wire, crimped bunch wire, flat wire and other specialty types.

★ ★ ★

The new location is in the building formerly known as the North Works of the American Steel and Wire Company.

New Electronic Timer

General Control Company, Boston 34 Massachusetts, has developed a new promatic Electronic Timer . . . capable of controlling timed operations between 60 milliseconds and 60 seconds.

★ ★ ★

The discharge of a resistor-capacitor network through a sensitive gas tetrode relay tube provides the basis for each timing period, the

duration of which may be manually set by a potentiometer. Steps within the overall timing range are adequately covered by plug-in condensers.

★ ★ ★

The time period is set manually by means of the indicator and the large 3⅜" dial. Timing commences upon closure of any external switch; control contacts either open or close at end of timing, depending upon actual circuit requirements. Control contacts are double pole double throw, rated at 10 amperes, 125 volts a-c, non-inductive. Operation is from 115 volts a-c or 220 volts a-c, 60 cycle.

★ ★ ★

Similar in appearance to their Synchronous-motor Timer for timing periods between ½ second and 24 hours, "matched timer housings" are now available for use in dual-timer applications. These timers may be mounted back-of-panel, against a wall, or in the rear of a cabinet. Wide-spaced barrier strips may be located either on the front or the back of the timers.

★ ★ ★

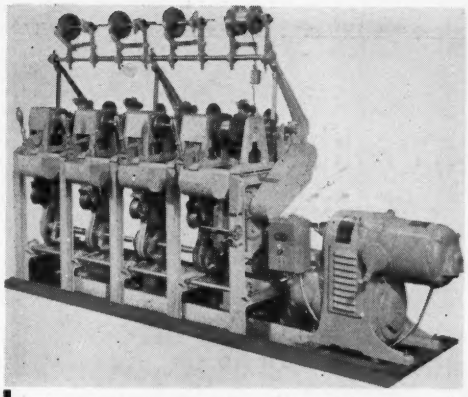
Typical applications include: automatic process control, on machine tools and molding machines, for laboratory life tests, etc.

Diamond Industry's Role in Rearmament

Need for cooperation with the United States Government's rearmament program was the theme of the Seventh Annual Convention of the Industrial Diamond Association of America at the Princess Hotel, Bermuda. In all 108 delegates and guests attended, including men from Canada and Britain, and seven who came directly from South Africa, after attending the Diamond Drilling Symposium held in Johannesburg.

★ ★ ★

The Association represents the industrial diamond industry in the United States. The industry itself is an important part of the nation's production, producing diamond tools and wheels for many sections of industry. The important part played by wire drawing diamond dies is well known to every reader of Wire & Wire Products. Some of the read-



1900-HV MULTIPLE SPINDLE SPOOLER

SPECIFICATIONS
Size Range: .010" to .080" or heavier if soft and many flat wire sizes.
Max. Spool Size: 16" flange diameter.
Capacity: usually 4 to 8 spindles.

The 1900-HV Spooler is a rigid, precision machine which will consistently produce a uniform, dense wire lay. Both the traverse and spindle drives are regulated through wide-range, stepless, variable speed units, eliminating change gears. The 1900-HV is completely adaptable to your particular constant or changing demands. All controls are positive. Adjustments are made accurately with the spooler in operation and without tools.

Both smooth acceleration and rapid stopping is obtained through a single lever at each station. Spool changing is simple and rapid. Anti-friction bearings are used on all shafting and spindles.

Your special requirements can be incorporated into the design. Each machine is delivered ready for operation from your power supply.

Payoff stands furnished as extras.

Consult us on your spooling problems.

ROBERT J. EMORY COMPANY
31 East Runyon Street Newark 5, N. J.

New! IMPROVED LOW COST FLASH BAKER

Mr. John R. Morrison, who originated and has built most of the Flash Bakers now in use, announces a new, improved, low cost Baker with these important features:

MORE COMPACT—requires only small pit below floor level.
FASTER BAKING—due to increased air velocity and reduction in waste space in baking chamber.
LESS MAINTENANCE—new ram-jet type burner equipment replaces old style brick combustion chamber with its inherent, troublesome failures.
GAS OR OIL FIRED—use either fuel instantly.
SHIPPED COMPLETELY ASSEMBLED—low installation costs.
All of which add up to a more efficient Flash Baker—at low cost.

Write for complete specifications.

MORRISON INDUSTRIES, INC.
engineers & builders of industrial process equipment
furnaces • ovens • dryers • washers • pickling and plating machines • material handling systems • wire mill equipment • special production equipment
17100 MILES AVE • CLEVELAND 28, OHIO

UNUSUAL OPPORTUNITY FOR WIRE AND CABLE PRODUCTION SUPERINTENDENT

An independent, prosperous and well financed copper wire and cable company located in a small city in upper New York State is seeking a new production superintendent. Requirements are managerial and planning ability, experience in directing a labor force of some 200 men and women, a broad experience in the drawing, annealing, stranding, bunching and braiding of fine sizes of copper wires plus experience in the application of extruded thermoplastic coverings. Please write fully of your record and experience and state your salary requirements. Box No. 655.

WIRE DRAWING

FROM .0403" TO .005" (Not Annealed)

FERROUS and NON-FERROUS WIRES

SPECIALISTS IN:

- WIRE STRANDING
- BUNCHING
- SPOOLING
- BRAIDING

Please write to

BUY WITH CONFIDENCE ANCHOR QUALITY

ANCHOR WIRE CORPORATION
183-16 JAMAICA AVE.
JAMAICA 3, LONG ISLAND, NEW YORK

ers, of course, are more familiar with cable wires than, for instance, the super-fine and almost invisible wires used in the modern electronic devices. In fact, wires drawn through diamond dies, besides producing every filament in the hundreds of millions electric lamps produced each year, are responsible for the production of the minute resistors and coils in radio, radar and guided missiles and the drawing to ranges up to heavy copper and other wires. All filament wires are drawn through diamonds, and most grinding wheels for the automotive and other processing plants are dressed and trued with diamonds. The manufacture of carbide tools is dependent upon diamond wheels and powders.

★ ★ ★

Besides committee and other internal affairs of the I.D.A., one aspect of the industry discussed at the Convention was the salvaging of waste diamonds and powders. New processes for recovering this material were discussed.

★ ★ ★

The new officers: President, Harold E. Robison, Wheel Trueing Tool Company, Detroit; First Vice President, Wm. F. Mullins, Werdiger & Mullins Co., New York; Second Vice President, Piet Smit, J. K. Smit & Sons, Murray Hill, N. J.; and the following new directors: Walter Schwartz, Detroit; John H. Carter, Cleveland; Stephen Hofman, New York; and James A. Ross, Scranton. Athos D. Leveridge continues as Secretary-Treasurer and Executive Manager.

Bridgeport Brass Names General Sales Manager

Chester M. Adams was recently appointed general sales manager, **Bridgeport Brass Co.**, Bridgeport, Conn. He will direct the sales activities of all company products. Mr. Adams has been with Bridgeport Brass for many years.

New Western Division Manager for Townsend

The Townsend Co. has appointed **Edward C. Sterling Jr.** western division sales manager, with headquarters at the Cherry Rivet Division offices in Los Angeles. He replaces **Edward H. Stau**, who has resigned.

REELS **SPOOLS**

ALL SIZES

WOOD-PLYWOOD-WOOD-METAL

RETURNABLE NON-RETURNABLE

Samples and Prices on Request

DURKEE MFG. CO. **PINE RIVER, MINN.**

Revised Catalog Describes Thermocouple Assemblies and Components

To present its complete line of standard thermocouple assemblies and parts, **Leeds & Northrup Company** has just published a newly-revised and illustrated 44-page catalog, Catalog EN-S2 — "Thermocouples—Assemblies, Parts and Accessories"—which not only offers the latest information on available couples and couple assemblies for general applications, but also includes an expanded section on special couples for plant and laboratory.

In a simplified tabular arrangement, the publication lists the accuracy limits of couples, the temperature and physicai limitations of thermocouple and protecting tube materials, and the recommended protecting tube and well materials for general applications. The expanded section on special couples includes those for such applications as open-hearth, glass feeder, pickling acid, steam plant, and blast furnace installations. Component parts of couple assemblies—heads, tubes, elements, insulators, etc.—are fully described and illustrated. The catalog itself has a handy margin-index to facilitate finding specific sections.

★ ★ ★

A copy of Catalog EN-S2 will be sent upon request. Address Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia 44, Penna.

★ ★ ★

To Handle Foreign Sales for Hydropress, Inc.

Hydropress, Inc., New York, announces the appointment of Jacques W. Lourié, Director of Foreign Sales. Mr. Lourié, is mechanical engineer, has been a leading staff member of Hydropress and its Loewy Rolling Mill Division for more than a decade.

WAYNE DIAMOND WIRE DRAWING DIES

Quality in Diamonds + Perfection in Workmanship = Good Wire.

Satisfactory DIAMOND DIES can only be made by those who have experience, skill and knowledge. WAYNE has all of these. Users have called WAYNE DIES "the best."

WAYNE WIRE DIE CO., 200 Pennsylvania Ave., Hillside, N. J. Telephone: Elizabeth 2-2456

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(TWISTING)
AND
STRANDING
IN THE WIRE AND GENERAL MANUFACTURING PROCESSES

SPECIALIZED ENGINEERING AND SPECIALIZED FACILITIES AT YOUR SERVICE

Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.

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Engineered to Your Particular Requirements

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MUSIC WIRE and SPECIAL WIRES

Music Wire for Industrial Purposes

In Over 100 Sizes, Polished and Tinned, from .0015" to .359" in dia.

Aluminum — Annealed — Belt Lacing — Brass, Soft and Spring — Copper, Bare and Tinned Coppered Steel Spring — Galvanized — Tinned

Monel — Nickel Silver — Pure Soft Nickel — Oil tempered, Steel Spring, Black Finish Phosphor Bronze, Spring Temper — Picture Wire — Iron Wire, Pure — Resistance Wire,. Hoskins Chromel "A" — Stainless, Soft and Spring Temper — Tag Wire, 1000 in an Envelope — Florist Wire — Spooled and Coiled, ¼-½-1-5#

Wires Straightened and Cut to length — Small Gauges — Small orders our specialty Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless. Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

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All Machines Reconditioned in Our Own Shop

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***Buy the Best:* MONTGOMERY SILVER-COATED COPPER WIRE**

Hard or Annealed—on spools.

Suitable for: Hookup Wire—Radio Frequency Cables—Circuit and High Temperature Wires—as specified by the Armed Services—and others.

WRITE FOR DETAILS

Also makers of Bare Tinsel Conductors

Send for samples and engineering data.

THE MONTGOMERY COMPANY

25 Canal St., Windsor Locks, Conn. Tel.: Windsor Locks 14

"Steel Wire in America"

An important new book, sponsored by The Wire Association and written by Kenneth B. Lewis, Wire Mill Consulting Engineer, has just been published.

★ ★ ★

While not a handbook on steel wire practice, since such technical treatises are readily available, Steel Wire in America is a publication that every wire man can read to advantage and enjoy at the same time.

★ ★ ★

The author, one of the best-informed men in the country on the problems and processes of steel wire making, in this book has primarily traced the third great revolution in wire technology from which we are just emerging, giving such historical background material on the first and second major revolutions, as to make current trends comprehensible.

★ ★ ★

Mr. Lewis sifts out the causes and consequences of the changes that have occurred in wire mill practices, assigning credit to men and companies, as each may have contributed to the new processing practices. Steel wire from rod rolling through its various steps down to its preparation for fabrication into wire products is covered. The book may be said to be essential to an overall understanding of the wire industry and, as such, will be of interest to both executives and production men.

★ ★ ★

"Steel Wire in America" runs 360 pages, sells for $15.00 a copy and may be ordered through Wire and Wire Products, 453 Main Street, Stamford, Conn.

While the book was sponsored by The Wire Association, its publishing was made possible through the thoughtful generosity of the concerns whose names follow, each of whom contributed $200.00 in advance of publication. Their names are suitably memorialized in the forepart of the book in recognition of their co-sponsorship of Mr. Lewis' work:

Aetna-Standard Engineering Co., Youngstown, Ohio
American Chemical Paint Co., Ambler Pennsylvania
Atlantic Steel Co., Atlanta, Georgia
Canada Wire & Cable Co. Ltd., Toronto, Ontario, Canada
Carboloy Company Inc., Detroit, Michigan
Cleveland Tramrail Division of Cleveland Crane & Engineering Co., Wickliffe, Ohio
Continental Steel Corp., Kokomo, Indiana
The Electric Furnace Co., Salem, Ohio

YARNS

For electric wire. Acetate, nylon and silk, natural or dyed. Put up on braider tubes, spools or cops.

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P. O. Box 1154, Charlotte, N. C.
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Vapor - from - Paper
STOPS RUST

Now wire is being protected in storage and in shipment without oil or grease. VPI vapor permeates area within carton. Makes air and moisture harmless to shiny wire surfaces. For "VPI Facts", write: Angier Corporation, Framingham 3, Mass.

ANGIER VPI* WRAP

*Reg. U.S. Pat. Off.
Vapor Rust Preventive

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Wm. Glader Machine Works, Chicago, Illinois
Indiana Steel & Wire Co., Muncie, Indiana
Industrial Ovens Inc., Cleveland, Ohio
Keystone Steel & Wire Co., Peoria, Illinois
Micro Products Company, Chicago, Illinois
R. H. Miller Co., Inc., Homer, New York
Morgan Construction Co., Worcester, Massachusetts
Mossberg Pressed Steel Corp., Attleboro, Massachusetts
Nehring Electrical Works, DeKalb, Illinois
Standard Industrial Compounds Co., Chicago, Illinois
The Steel Company of Canada, Limited, Montreal, Quebec, Canada
Syncro Machine Company, Perth Amboy, New Jersey
The Trembicki Company, Chicago, Illinois
The Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wean Equipment Corp., Cleveland, Ohio
Lee Wilson Engineering Co. Inc., Cleveland, Ohio

Wire and Cable Reels in Short Supply

Manufacturers of wire, wire rope and cable reels are currently plagued by a shortage of reels and spools, large and small, used to ship their products to customers. Every mill is urged to ask its customers to return reels for re-use.

★ ★ ★

The large cable reels using steel drums are particularly hard to come by. The flanges, usually made of seasoned spruce, are also not too easy to replace.

★ ★ ★

Please ask your customers to scour their storage mills and back lots and get these "empties" back into circulation.

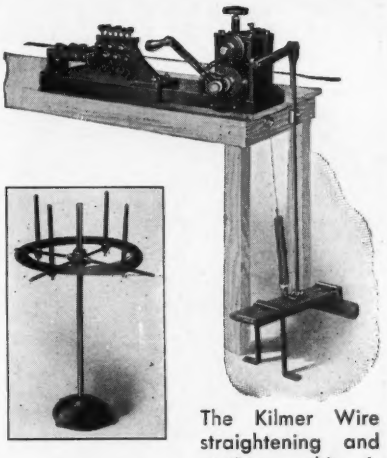
Bulletin Issued on New Wire Winder

Standard Mill Supply, 1080 Main Street, Pawtucket, R. I., has issued a bulletin on a newly designed and improved model of their "Uni-Drive" Wire Winder.

The new machine increases production by virtue of its higher speed and new features are said to produce smooth and more evenly wound spools of wire in either single or multiple ends. Up to twelve ends of wire may be wound in perfect alignment with the spool heads. So perfect are the lays of wire, with no under or over-winding, that all possibility of "over-lap kinks", that cause breakage in the braiding process, is eliminated.

The winder is furnished with a specially designed payoff that con-

WIRE STRAIGHTENER

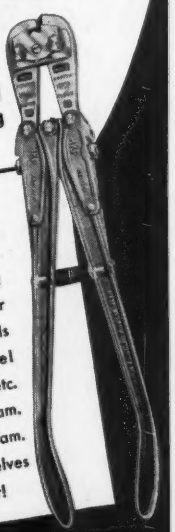


The Kilmer Wire straightening and cutting machine is hand operated and recommended for wire No. 8 to No. 19 gauge.
Wire Reel will handle coils up to 150 lbs. with I.D. adjustments from 7" to 22" and 30" O.D.

M. D. KILMER & COMPANY
4840 BROOKPARK RD.
CLEVELAND 9, OHIO

PORTER CARBIDE-EDGED CUTTERS

for extremely hard materials, including stainless steel.



Stand up under the hardest usage. Tough carbide edges firmly brazed to cutting jaws. Excellent for extra hard materials like stainless steel rods, wires, pins, etc. #3 cuts to 5/16" diam. #4 cuts to 1/8" diam. Pay for themselves many times over!

ORDER THROUGH YOUR INDUSTRIAL SUPPLY HOUSE

H. K. PORTER, INC., Somerville 43, Mass.
Manufacturers of PORTER CUTTERS, PORTER PRUNERS and PORTER-FERGUSON Auto Body-Fender Repair Tools

METAL BOUND RETURNABLE REELS

Made in 12" to 24" diameters.

No nails used. *All glued construction.* Made of kiln-dried wood. Special design prevents breaking or splintering of wood, protecting insulated wire from damage.

Write for details

WILLIAM McCASKIE, INC.
FORGE ROAD • WESTPORT • MASS.
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RECLAIM YOUR DIAMOND POWDER

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new and exclusive process. This process is more efficient and recovers higher percentages of greater purity of used diamond powders.

Diamonds from worn grinding wheels, grinding wheel sludge and dust, cotton charged with powder used in die polishing, die washings and diamond bearing scrap — all

RECLAIMED SUCCESSFULLY

Don't waste diamond bearing materials — they're valuable.

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COPPER • BRASS • LOW BRASS • PHOSPHOR BRONZE NICKEL SILVER • PURE NICKEL • MONEL • STEEL-TINNED AERIAL • BRUSH (in all metals) and Twisted Wires.

Specialists in wires for Weaving and Brush Wires.

All types of Non-Ferrous and Ferrous Wires for Fillers, Screens, Brushes, Weaving and so forth, down to the smallest diameters—*in all metals.*

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trols tensions evenly, regardless of whether the spool is full or empty, and is provided with a stop-motion attachment to control each strand of wire.

★ ★ ★

Designed particularly for winding spools of wire to be braided and shielded for electrical conductors and communication cable in sizes up to ¾" in diameter, this winder will be found to be of great value wherever precision winding is a necessity.

★ ★ ★

Full details may be secured by writing the company for the bulletin.

Electric Wire Distributors Moving New Building

The sixth anniversary of the **Standard Wire & Cable Co.**, Southern California jobbers of every conceivable type of electrical wire and cable, was observed in May when the firm moved into a new 10,000 sq. ft. office and sales building at 3440 Overland Ave., Los Angeles, it was announced by I. M. "Bucky" Harris, founder and executive partner.

★ ★ ★

Organized in May, 1946, by Harris and his partner-brother, Maxwell E. Harris, the firm's original quarters was a small storeroom with 1500 sq. ft. of floor space on South Broadway. As Standard's reputation for a complete stock of its products and customer service spread throughout the Southland, the company outgrew its first building and moved to 9608 Venice Blvd. in Culver City.

★ ★ ★

Today Standard does an annual gross of approximately $500,000 in sales and moved again, this time to quarters more than twice as large as its present 4500 sq. ft. of floor space.

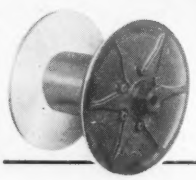
★ ★ ★

The new commodious headquarters are near Venice Blvd., close to "Culver Center", the growing West Los Angeles retail shopping area.

MILTON MACHINE
RUGGED in design . . . DEPENDABLE in service!

Save on replacement and maintenance!

RUGGED STEEL HEAVY DUTY PROCESSING REELS



Having trouble with light weight reels failing in heavy duty service? Send us a sketch or print stating the limiting dimensions and service required, we'll be glad to tell you about our facilities for supplying the wire rope and cable industry with special heavy duty processing reels, spools or bobbins. WRITE FOR BULLETIN 52-W.

MILTON MACHINE WORKS, Inc.
DESIGNERS — ENGINEERS — MANUFACTURERS
MILTON • PENNA.

DIAMOND DIES .0006 - .120 DIAMOND POWDER
INDUSTRIAL
AJAX
SUPPLIES INC.
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NEW ENGLAND WIRE DIE CO.
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EXPERT RECUTTING
DIAMOND DIES, DIAMOND POWDERS
Eastern Representative of
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Diamond Dies
Guaranteed Perfect for
Any Wire Drawing
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WIRE DIE CORPORATION
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CARBIDE WIRE
DRAWING DIES
DIAMOND POWDER
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Complete Reclaiming Services
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Drawing
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Dies

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WIRE DIE CORPORATION
300 W. 56th St., NEW YORK
Tel. COlumbus 5-1340

Lindberg Plant Expanded

Lindberg Engineering Company of Chicago, manufacturers of a wide variety of industrial products and heating equipment have just announced an increase of their manufacturing facilities.

★ ★ ★

With the opening of Lindberg Plant No. 2, additional 6200 square feet of production space are now available to energetically attack a backlog created by the unusual acceptance of Lindberg equipment during the past six months.

★ ★ ★

C. H. Stevenson, V.P., states that deliveries will improve even beyond the record shipments in April, where they reached an all time high.

★ ★ ★

Plant No. 2 at 2317 Grand Avenue will manufacture laboratory furnaces, small induction heating units, Fisher type melting furnaces and atmosphere generators, thereby relieving the main plant to speed up production of large industrial heat treating furnaces.

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WIRE DRAWING DIES
and
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Skill and accuracy in manufacture with the use of selected stones make Balloffet-Vianney Diamond Dies the choice of the most critical users.

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Outstanding in quality,
workmanship and service.
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TUNGSTEN CARBIDE WIRE DRAWING DIES
DESIGNED FOR LONG LIFE AND MAXIMUM WIRE PRODUCTION
Furnished semi-finished to within .001" to .002" of finished size at rough-drilled die prices. Require only light sizing and polishing before using. Our dies embody special design features that make for superior performance.
Also, a full line of carbide tooling for the Cold Heading Industry
EASTERN CARBIDE CORPORATION
NEW ROCHELLE, N. Y.

Wire Drawing Machinery

Featuring —
High Speed Upright Cone Machines.
Also —
Bull Blocks and Benches, Continuous Wire Drawing Machines, Spoolers, Pointers, String-up Machines, etc.
And —
Cold Heading Machinery.

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Waterbury, Conn.

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A SPECIALIZED CAM MILLING SERVICE... JIG BORING... SPOT WELDING... CONTRACT PRODUCTION... EXPERIMENTAL DEVELOPMENT
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Wire Drawing Machines.
Galvanizing & Tinning Installations.
Wire Flattening Mills.
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Surface HEAT TREATING FURNACES
For Ferrous and Non-Ferrous Wire.
Prepared Atmosphere Generators.
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WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames — 16" Frames, 8" Frames — Take-Up Frame, Wire — Pointers — Puller Tongs. — General and heat resisting alloy castings for wire mill use.
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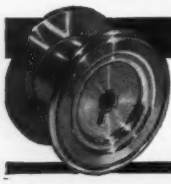

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Drawn Aluminum Alloy Spools for Precision Wire Packaging. Also Steel Spools for heavy duty processing.
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WIRE MARKING DISKS
for identifying Plastic Wire
BELMONT PHOTOGRAVURE
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REELS — METERS
COLLAPSIBLE COILING REELS
MEASURING MACHINES
SMALL SPECIAL REELS
METERS FOR MEASURING THE LENGTH OF WIRE AND OTHER MATERIALS
NEAL COMPANY
P. O. BOX 237 OMAHA, NEB.

Some Properties of Low Carbon 8½ Percent Nickel Steel

This 12-page booklet describes a ferritic steel that is resistant to the embrittling effects of low temperatures (—320°F) and which can be welded and fabricated under somewhat the same conditions as engineering steels. 20 tables and charts depict the mechanical properties and the effects of heat treating and welding. Though low carbon 8½% nickel steel is of special interest to petroleum refining and chemical processing fields, corrosion resisting applications are suggested for it in oil well, pulp and paper, machine tool and other industries. **International Nickel,** Dept. EZ, New York 5, N.Y.

Folder on Bambury Mixers

Hale and Kullgren, Inc., Akron, Ohio, has issued a four-page folder on the rebuilding of Banbury Mixers, in addition to new mixing chambers and parts.

★ ★ ★

Photographs show progressive steps in rebuilding a Banbury Mixer and various parts after they have been rebuilt. There is also a brief explanation of the Hale and Kullgren organization, Sales Representatives for Plastic and Rubber Machinery for The Aetna-Standard Engineering Company.

★ ★ ★

For a copy of this folder, write to Hale and Kullgren, Inc., First Federal Savings and Loan Building, Akron 8, Ohio.

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ACID INHIBITOR • PICKLING COMPOUND
THE PARKIN CHEMICAL CO.
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MACHINERY FOR HIGH SPEED PRODUCTION
BRAIDERS CABLERS TAKE-UPS BUNCHERS STRANDERS TAPING MACHINES
NEW ENGLAND BUTT COMPANY
304 Pearl Street, Providence 7, R. I.
James Day (Machinery) Ltd. 28 Maddox Street, London W1, England

CLEVELAND TRAMRAIL
Division of
THE CLEVELAND CRANE & ENGINEERING CO.
WICKLIFFE, OHIO
Leading manufacturers of
OVERHEAD MATERIALS HANDLING EQUIPMENT
for the Wire and Wire Products Industry

GET THE BEST IN REELS
HOWSAM SPOOL COMPANY
AURORA • ILLINOIS
Exclusive Feature: "Pressure Pad" Fasteners. Patent applied for.

CHEMSTEEL CONSTRUCTION COMPANY, INC.
205 Chemsteel Bldg., Walnut St., Pittsburgh 32, Pa.
Send data on Engineering & Construction facilities for
ACID-ALKALI-PROOF CONSTRUCTION
of pickling and other tanks; flooring.
(TEAR OUT & MAIL WITH LETTERHEAD)

WOOD REELS
STANDARD - METAL-BOUND - SPECIAL
for
WIRE, WIRE ROPE and CABLE
NORTH ANSON REEL CO.
NO. ANSON, MAINE

TOOLS TALIDE DIES
WEAR PARTS
Talide Metal, the super hard tungsten carbide gives increased production, better finish, less down time and scrap on all wire mill operations.
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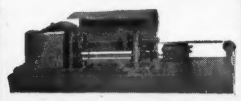

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ABRASIVES—
Ace Abrasive Laboratories, New York, N. Y.
Elgin National Watch Co., Abrasives Division, Elgin, Ill.
Norton Co., Worcester, Mass.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ACID-PROOF CONSTRUCTION—
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.
Trauwood Engr. Co., Cleveland, O.

ANNEALING POTS AND BOXES—
Scudder, E. J. Foundry & Mach. Co., Trenton, N.J.

BAKERS—(See OVENS—Rod Bakers)

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

BORAX—Wire Drawing
Pacific Coast Borax Co., New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAKES—Pneumatic
Entwistle, Jas. L. Co., Providence, R. I.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

CARTONS—Paper
(See CONTAINERS—Paper, for nails, etc.)

CASTINGS—Wire Mill
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Acid Proof
Ceilcote Company, Cleveland, Ohio

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Magnus Chemical Co., Garwood, N. J.
Metal & Thermit Corp., New York, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANING & PICKLING EQUIP.—
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corporation, Newark, Del.
Holden, A. F., Company, The, Detroit, Mich.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

CLOTH—WIRE, All Metals
American Brass Co., The, Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Groma Trading Corp., New York, N. Y.
Roebling's, John A. Sons, Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Diamond (Pre-Mixed)
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Division, Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.

COMPOUNDS—For Improving Drawing and Extrusion
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Metal & Thermit Corp., New York, N. Y.

COMPOUNDS—Phosphate Coating
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Pacific Coast Borax Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.
Swift & Company, Chicago, Ill.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

CONTAINERS—Paper, for Nails, etc.
International Paper Company, Chicago, Ill.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

CORROSION PREVENTIVE PAPERS—
Angier Corporation, The, Framingham, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

CUTTING TOOLS—Wire
Porter, H. K. Inc., Somerville, Mass.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Ace Abrasive Laboratories, New York, N. Y.
Danforth, The C. W. Co., Youngstown, Ohio
Elgin National Watch Co., Abrasives Division, Elgin, Ill.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
National Research Company, St. Claire Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER RECLAIMING—
Danforth, The C. W. Co., Youngstown, Ohio
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
National Research Co., St. Claire Shores, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Carboloy Dept. of General Electric Co., Detroit Mich.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Wayne Wire Die Co., Hillside, N. J.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Cold Heading
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Vascoloy-Ramet Corp., No. Chicago, Ill.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., New York, N. Y.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York, N.Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Extrusion
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelly Wire Die Corp., New York, N. Y.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Murex, Ltd., Rainham, England.

DIES—Swaging
Murex, Ltd., Rainham, England
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Murex, Ltd., Rainham, England.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS & TRAVERSES—Flange Steel
Entwistle, Jas. L. Co., Providence, R. I.
Niles Steel Products Division, Republic Steel Corporation, Niles, Ohio

WHERE TO BUY, Continued

DRYING EQUIPMENT—
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Rockwell, W. S. Co., Fairfield, Conn.

ENGINEERS—Consulting
Metal Fatigue—Fatigue of Materials Laboratory, Princeton, N. J.
Wire Mill—Lewis, Kenneth B., Worcester, Mass.
Zinc—Imhoff, Wallace G., Co., No. Highlands, Calif.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio
Harper Electric Furnace Corp., Buffalo, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Morrison Industries, Bedford, Ohio.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, Detroit, Mich.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Resistance Heating, Strand
(See Annealing Machines)

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F. Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOOKS—Pickling & Liming
Bronze Die Casting Co., Pittsburgh, Pa.
Heil Process Equipment Corp., Cleveland, Ohio
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio

IMPREGNATING MATERIALS—
Solar Compounds Corporation, Linden, N. J.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, P.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.
Merrimac Paper Co., New York, N. Y
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.
U. S. Rubber Co., Naugatuck Chemical Div., New York, N. Y.

INSULATING MATERIALS—Paper— For Electric Wire Cable.
Merrimac Paper Co., New York, N. Y.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

LACQUERING SYSTEMS — See MACHINERY—Lacquering Electric Wire

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

LUMBER—Wire Mill, Carload shipments for lagging and car blocking
North Anson Reel Co., No. Anson, Me.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Machine Works, Chicago, Ill.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Solomon, Michael, New York, N. Y.
Wardwell Braiding Machine Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, P.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Wind-Up)

MACHINERY—Chain Making
Nilson, A. H. Machine Co., Bridgeport, Conn.

MACHINERY—Closing Rope
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Fenn Manufacturing Co., The, Hartford, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Porter, H. K., Inc., Somerville, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.

MACHINERY—Die Making
Carboloy Dept. General Electric Co., Detroit, Mich.

MACHINERY—Descaling Rod, Dry
Firth Sterling, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wartenweiler, Emilio, Milano, Italy

MACHINERY—Edging (See MACHINery — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.

MACHINERY—Extruding
National Rubber Machinery Co., Akron, Ohio
Royle, John, & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Fenn Manufacturing Co., The, Hartford, Conn.
Mettler Machine Tool, Inc., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Nilson, A. H., Machine Co., Bridgeport, Conn.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
National Rubber Machinery Co., Akron, Ohio
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Solomon, Michael, New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R.I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia, Pa.
Industrial Ovens, Inc., Cleveland, O.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.

MACHINERY—Material Handling (See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Nail and Tack
Baird Machine Co., The, Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.
Wean Equipment Corp., Cleveland, O.

MACHINERY—Power Transmission
Reeves Pulley Company, Columbus, Indiana

MACHINERY—Pre-Heater for Wire (for Extrusion of Plastics)
Industrial Ovens, Inc., Cleveland, Ohio
National Rubber Machinery Co., Akron, Ohio

MACHINERY—Re-Spoolers
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
Fidelity Machine Co., Inc., Philadelphia, Pa.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Rubber Insulating
National Rubber Machinery Co., Akron, Ohio
Royle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening & Cutting
Fenn Manufacturing Co., The, Hartford, Conn.
Kilmer, M. D., & Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Wartenweiler, Emilio, Milano, Italy
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Fenn Manufacturing Co., The, Hartford, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
Marshall-Richards Machine Co., Inc., Trenton, N.J.
Standard Machinery Co., Mystic, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna Standard Engr. Co., Pittsburgh, Pa.
Marshall-Richards Machine Company, Inc., Trenton, N. J.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Tube Winders
Solomon, Michael, New York, N. Y.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Solomon, Michael, New York, N. Y.
Wire & Textile Mchy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding (See WELDERS—Butt and Spot)

MACHINERY—Winding Wire
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L., Co., Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
New England Butt Co., Providence, R. I.
Standard Mill Supply, Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Fenn Manufacturing Co., The, Hartford, Conn.
Marshall-Richards Machine Co., Inc., Trenton, N.J.
Morgan Construction Co., Worcester, Mass.
Morgardshammers Mekaniska Verksbod, Morganshammer, Sweden.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn
Kilmer, M. D., & Co., Cleveland, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Angier Corporation, The, Framingham, Mass.
Marshall-Richards Machine C., Inc., Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Co., Cleveland, Ohio

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling, John A. Sons Co., Trenton, N. J.
Wickwire Brothers, Inc, Cortland, N. Y.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Bedford, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.
Morrison Industries, Bedford, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Bedford, Ohio

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.
Solar Compounds Corp., Linden, N. J.

PAPER—Creped Wrapping
Angier Corporation, The, Framingham, Mass.
Arkell Safety Bag Co., New York, N. Y.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Angier Corporation, The, Framingham, Mass.
Arkell Safety Bag Co., New York, N. Y.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS—(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Bronze Die Casting Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Standard Machinery Co., Mystic, Conn.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N. J.
Siogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Industrial Ovens, Inc., Cleveland, Ohio.
Kilmer, M. D., & Co., Cleveland, Ohio
Roll-A-Reel, Cincinnati, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Milton Machine Works, Inc., Milton, Pa.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L., Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio

REELS & SPOOLS—Wooden
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Minn.
North Anson Reel Co., No. Anson, Me.

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
McCaskie, Inc., Wm., Westport, Mass.
North Anson Reel Co., No. Anson, Me.

REELS—Non Returnable
(See Listings under REELS & SPOOLS—Shipping & Shop)

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
McCaskie, Inc., Wm., Westport, Mass.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N.J.
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
McCaskie, Inc., Wm., Westport, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio
North Anson Reel Co., No. Anson, Me.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS— (See Ovens—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
American Brass Co., The, Waterbury, Conn.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Company, Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's John A., Sons Co., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See Compounds—Rust Preventing)

SALTS—Heat Treating, Descaling, etc.
Holden, A. F., Co., The, Detroit, Mich.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

SOAPS—Industrial and Wire Drawing
(See Compounds—Wire Drawing)

SODIUM—for Descaling
Holden, A. F., Co., The, Detroit, Mich.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Art Wire and Stamping Co, Newark, N. J.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Heil Process Equipment Corp., Cleveland, Ohio

TESTERS — INSULATION (See MACHINERY—Spark Testers)

TESTING EQUIPMENT (See MACHINERY Testing, Physical)

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc. (See TINSEL—Electric Conductor)

TOOLS—Wire Cutting
Porter, H. K., Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

TUBE BENDERS AND FORMERS—
Kilmer, M. D., & Co., Cleveland, Ohio

TURKS HEADS—
Fenn Manufacturing Co., The, Hartford, Conn.

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.
Solar Varnish Corporation, Linden, N. J.

VULCANIZING PANS AND EQUIPMENT
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Malin & Co., Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, Ohio

WIRE—Barbed
Gerber, J., & Co., Inc., New York, N. Y.
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
American Brass Co., The, Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.

WIRE—Brush
Gerber, J., & Co., Inc., New York, N. Y.
Groma Trading Corp., New York, N. Y.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's John A., Sons Co., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
American Brass Co., The, Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Gerber, J., & Co., Inc., New York, N. Y.

WIRE—Flat, Fine
Anchor Wire Corp., Jamaica, L. I., N. Y.
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Gerber, J., & Co., Inc., New York, N. Y.
Groma Trading Corp., New York, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Forming
Art Wire and Stamping Co, Newark, N. J.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.

WIRE—Galvanized
Gerber, J., & Co., Inc., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Continental Steel Corp., Kokomo, Ind.
Gerber, J., & Co., Inc., New York, N. Y.
Groma Trading Corp., New York, N. Y.
Johnson Steel & Wire Co., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.

WIRE—Nickel Silver and Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Groma Trading Corp., New York, N. Y.
Malin & Co., Cleveland, Ohio.
Chase Brass & Copper Co., Waterbury, Conn.

WIRE—Oil Tempered
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Spring
American Brass Co., The, Waterbury, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Gerber, J., & Co., Inc., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Specialty Wire Co., Inc., Worcester, Mass.

WIRE—Steel—Also Coppered and Galvanized Steel
Anchor Wire Corp., Jamaica, L. I., N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Art Wire and Stamping Co., Newark, N. J.
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Allied Products Division, New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped (See PAPER—Creped Wrapping)

YARNS & TAPES—
Glass Fibers, Inc., Toledo, Ohio

YARN TESTERS—
Heineman Corp., Oscar, Chicago, Ill.
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE AND MASTICATING MACHINERY MANUFACTURERS

WATSON

EXTRA HIGH SPEED "VL" TYPE STRANDERS

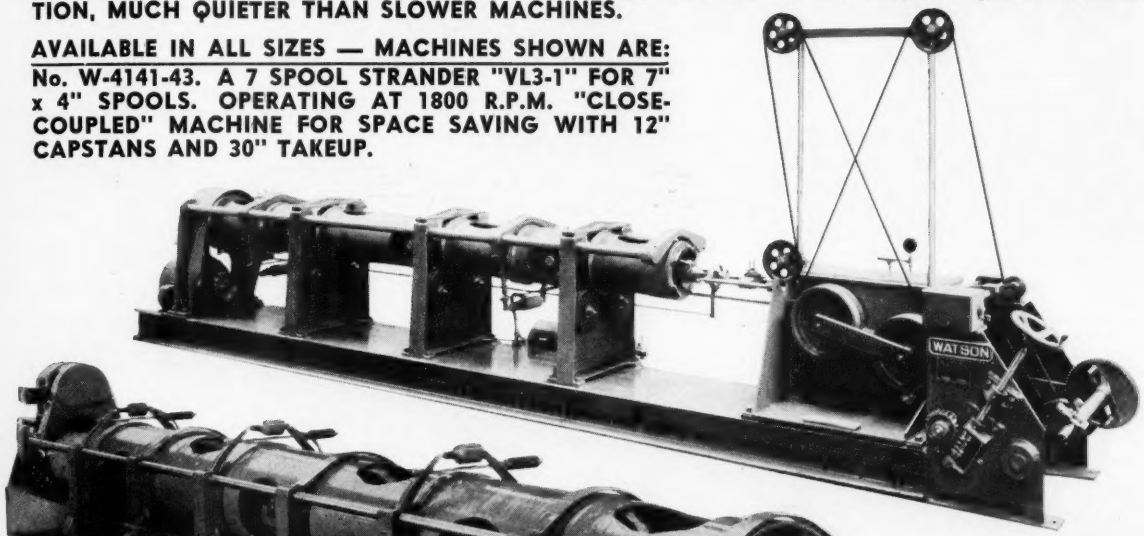
U.S. PATENTS 2,270,093 & 2,442,817. OTHERS PENDING & ALLOWED

THIS LATEST PATENTED DESIGN COMBINES HIGHEST POSSIBLE MACHINE SPEEDS AND LOADING TIME REDUCTION, RESULTING IN MACHINE UNITS OF UNPARALLELED PRODUCTIVITY.

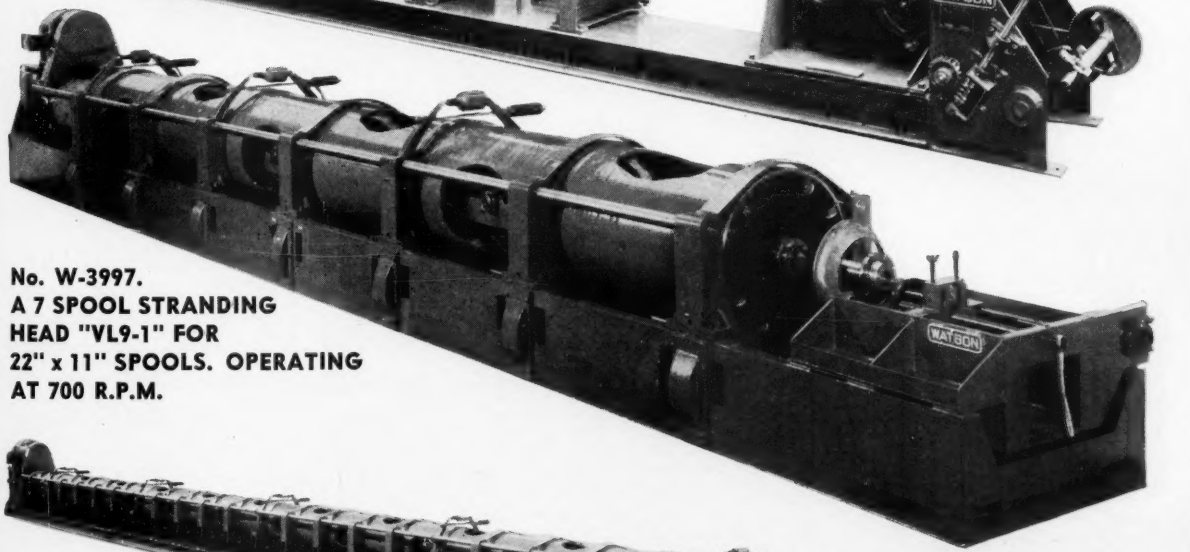
OUTSTANDING ADVANTAGES OF THIS OVER OTHER DESIGNS ARE: 1—"SHAFTLESS SELF-LOCKING PATENT BOAT CRADLES WITH INTEGRAL TENSIONS — NO LOOSE PARTS WHATSOEVER. 2—LOWER WIRE AND CORE LEAD ANGLES. 3—EXTREMELY QUIET OPERATION, MUCH QUIETER THAN SLOWER MACHINES.

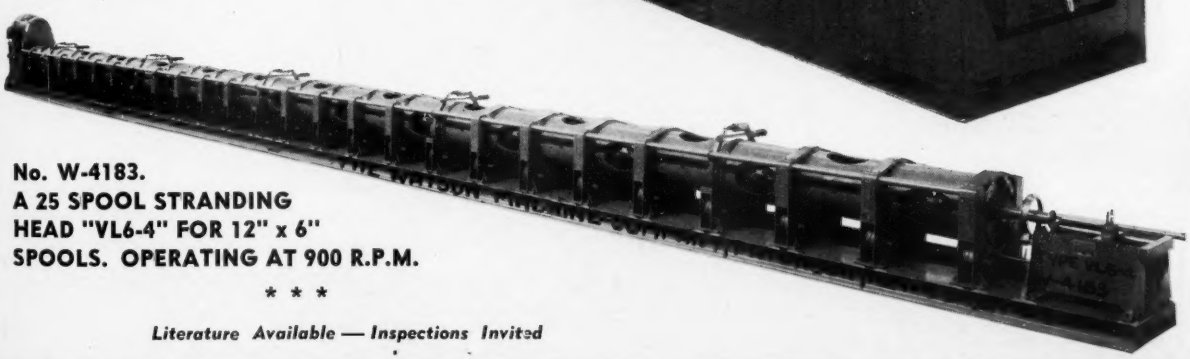
AVAILABLE IN ALL SIZES — MACHINES SHOWN ARE:

No. W-4141-43. A 7 SPOOL STRANDER "VL3-1" FOR 7" x 4" SPOOLS. OPERATING AT 1800 R.P.M. "CLOSE-COUPLED" MACHINE FOR SPACE SAVING WITH 12" CAPSTANS AND 30" TAKEUP.



No. W-3997. A 7 SPOOL STRANDING HEAD "VL9-1" FOR 22" x 11" SPOOLS. OPERATING AT 700 R.P.M.

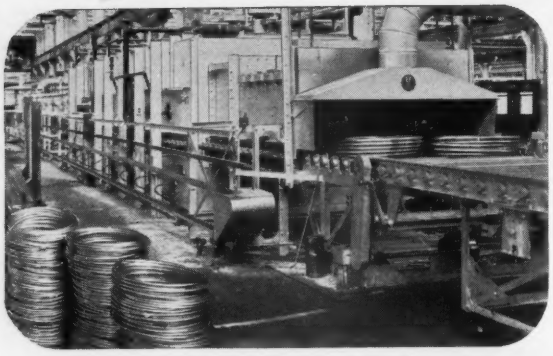




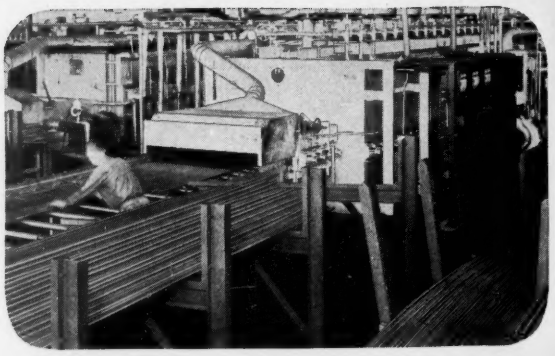
No. W-4183. A 25 SPOOL STRANDING HEAD "VL6-4" FOR 12" x 6" SPOOLS. OPERATING AT 900 R.P.M.

* * *

Literature Available — Inspections Invited



Straight lengths of brass and copper tubing are also bright and scale-free annealed in this EF gas fired furnace. Capacity 4000 lbs. per hour.

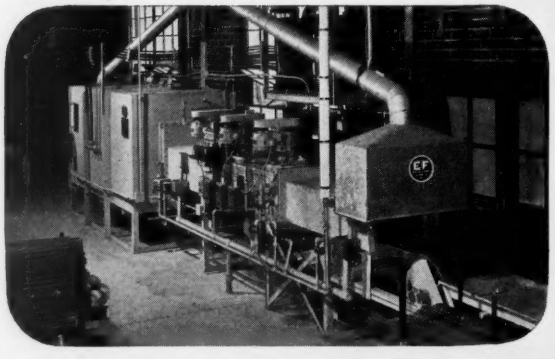


EF gas fired forced convection continuous roller hearth special atmosphere furnace bright annealing long straight lengths of tubing.

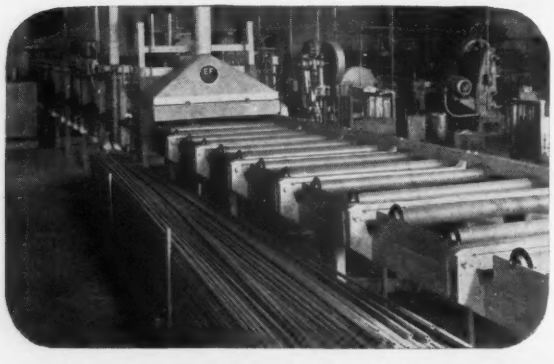
ANNEALING TUBING BRIGHT and CLEAN *Continuously*

We have built many outstanding production furnaces for processing copper, brass, stainless, aluminum, nickel silver and other ferrous and non-ferrous tubing—in large and small coils—straight lengths, long and short, and in various diameters—also for wire and many other products and processes.

Put your production furnace problems up to experienced engineers — *it pays.*



A special atmosphere belt conveyor electric furnace annealing short lengths of alloy tubing—operates at temperatures up to 2040° F.



3000 lbs. of steel tubing, per hour, are bright normalized in this EF gas fired radiant tube type special atmosphere furnace.

Straight lengths of tubing up to 5" in diameter and ¾" thick are also annealed in this EF forced circulation roller hearth furnace.

Gas-Fired, Oil-Fired EF and Electric Furnaces

for any Process, Product or Production

THE ELECTRIC FURNACE CO.

WILSON ST. at PENNA. R. R. *Salem - Ohio*